

THE DENALI HIGHWAY INFORMATION PLAN

for
THE UNITED STATES BUREAU
of
LAND MANAGEMENT



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FOR

THE UNITED STATES BUREAU OF LAND MANAGEMENT

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TABLE OF CONTENTS

	<u>Page</u>		<u>Page</u>
INTRODUCTION.	1	PROGRAM PLANS.	52
Purpose.	1	Signing Program	52
Need for Visitor Information	1	Interpretive Turnout Sign.	52
The Planning Area.	2	Premonitory Signs.	55
INVENTORY OF RESOURCES.	3	Trailhead Signs.	57
User Inventory	3	Interpretive Turnout Program.	59
User Desires.	3	Pamphlet Program.	96
Conclusions	6	Interpretation Through Local Residents.	96
Natural Resources Inventory.	7	Living History	96
Geology	7	Radio Tape	97
Vegetation.	10	COST ESTIMATES AND IMPLEMENTATION PRIORITIES FOR	
Wildlife.	15	THE DENALI HIGHWAY PLAN.	98
Fish.	27	RECOMMENDATIONS.	100
Water	32	SUMMARY.	101
Weather and Climate	33	BIBLIOGRAPHY	102
Historical and Cultural Inventory.	35	APPENDICES	106
Visitor Services Inventory	38	APPENDIX A, Trail Maps.	106
Emergency Services.	38	APPENDIX B, Sign Plate Information.	115
Lodges.	38	APPENDIX C, Weather Information Graphics.	118
Other Services.	38	APPENDIX D, Pamphlets	120
Recreation Inventory	40	APPENDIX E, Symbol Signs.	121
Trails.	40		
Campgrounds	46		
THE PUBLIC INFORMATION PLAN	47		
Theme.	47		
Objectives	47		
General Objectives.	47		
Working Objectives.	48		
Resources Recommended for Emphasis	48		
Geology	48		
Wildlife.	48		
Fish.	49		
Vegetation.	49		
Cultural-historical	49		
Recreation resources.	49		
Program Outline.	49		
Visitor Information Centers	50		
Interpretive Pullouts	50		
Signing Programs.	51		
Pamphlets	51		
Radio-tape Program.	51		
Living History Interpretation	52		
Summary	52		

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. General Desired Information--Major Categories.	3
2. Specific Desired Information by Categories	4
3. Rank Ordering of Information Desired by Visitors to the Denali Highway Area	5
4. Denali Area Vegetative Systems and Associated Wildlife	26
5. Denali Highway Services.	39

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Information Sign; Side View and Elevation.	53
2. Information Sign; Details	54
3. Premonitory Sign	55
4. Typical Trailhead Plan	57
5. Typical Trail Information Sign	58
6. Interpretive Signs, Visitor Information Center, Paxson . . .	60
7. Site Plan for Pullout No. 1, Paxson Visitor Information Center	61
8. Section AA (Pullout No. 1)	61
9. Paxson Visitor Information Center Detail	61
10. Site Plan for Pullout No. 2.	63
11. Section AA (Pullout No. 2)	63
12. Wrangell Mountains Illustration.	64
13. Site Plan for Pullout No. 3.	65
14. Section AA (Pullout No. 3)	65
15. Site Plan for Pullout No. 4.	66
16. Section AA (Pullout No. 4)	66
17. The Mountain Building Processes.	67
18. Site Plan for Pullout No. 5.	68
19. Section AA (Pullout No. 5)	68
20. Site Plan for Pullout No. 6.	70
21. Section AA (Pullout No. 6)	70
22. Formation of a Pingo	71
23. Site Plan for Pullout No. 7.	72
24. Section AA (Pullout No. 7)	72
25. Formation of Kettle Lakes.	73

<u>Figure</u>	<u>Page</u>
26. Site Plan for Pullout No. 8.	74
27. Section AA (Pullout No. 8)	74
28. Glacial Moraines	75
29. Site Plan for Pullout No. 9.	76
30. Section AA (Pullout No. 9)	76
31. Effect of Aspect Upon Vegetative Growth.	77
32. Summer Miniclimates.	77
33. Site Plan for Pullout No. 10	78
34. Section AA (Pullout No. 10).	78
35. Cross Section of Beaver Lodge.	79
36. Site Plan for Pullout No. 11	80
37. Section AA (Pullout No. 11).	80
38. Waterfowl Migrations from Interior Alaska.	81
39. Site Plan for Pullout No. 12	82
40. Section AA (Pullout No. 12).	82
41. Formation of an Esker.	83
42. Site Plan for Pullout No. 13	84
43. Section AA (Pullout No. 13).	84
44. Frost Wedging	85
45. Site Plan for Pullout No. 14	86
46. Section AA (Pullout No. 14).	86
47. Placer Mining Process.	87
48. Site Plan for Pullout No. 15	88
49. Section AA (Pullout No. 15).	88
50. Site Plan for Pullout No. 16	90
51. Section AA (Pullout No. 16).	90

<u>Figure</u>	<u>Page</u>
52. Effects of Permafrost on Vegetation.	91
53. Site Plan for Pullout No. 17	92
54. Section AA (Pullout No. 17).	92
55. Formation of Pyramid Peak.	93
56. Site Plan for Pullout No. 18	94
57. Section AA (Pullout No. 18).	94

LIST OF MAPS

<u>Map</u>	<u>Page</u>
1. Study Area Location.	2
2. Denali Highway Geology	9
3. Denali Highway Vegetation.	11
4. Denali Highway Wildlife, Caribou and Dall Sheep.	17
5. Denali Highway Wildlife Moose.	18
6. Denali Highway Fishing Locations	28
7. Denali Highway Suggested Locations for Wildlife Wymbol Signs	56
8. Visitor Information and Points of Interest	96
9. Denali Highway Trail Map Locations	106
10. Trail Map 1	107
11. Trail Map 2.	108
12. Trail Map 3.	109
13. Trail Map 4.	110
14. Trail Map 5.	111
15. Trail Map 6.	112
16. Trail Map 7.	113
17. Trail Map 8.	114

INTRODUCTION

Purpose

This is a public information plan for recreation visitors in the Denali Highway area. The plan focuses upon providing practical and interesting information in a way which will make visits to the Denali Highway area enjoyable, interesting and safe.

In order to help assure that the information recommended will have a positive effect on the users and is available to them, detailed background information has been collected to identify what the users of the Denali Highway area want, and what resources are available in the area to meet the user desires.

This report begins with a comprehensive inventory of user interests and desires. Natural resources, historic and cultural resources, recreation resources, and available services were also inventoried. Objectives and recommendations were developed from this inventory. The plan synthesizes the information and recommendations into media and designs to communicate the information to the users in an aesthetic and existing way. The purpose is to meet the user desires, and create within them an awareness for the resources of the Denali Highway area.

Need for Visitor Information

The Denali Highway is an alternative route to Mt. McKinley National Park, used primarily by summer recreation visitors. The area is known for its scenic grandeur and offers many outstanding recreation opportunities such as fishing, hiking, photography, hunting, and a chance to observe a variety of wildlife. The area and highway drive is undoubtedly enjoyed by its visitors, but the overall recreation experience can be enhanced through a public information program so as to provide a more satisfying and interesting trip.

There are many reasons to supply visitors with information, but the following are perhaps the most important for the Denali Highway area:

Enjoyment - Information is needed before a visit to help the visitor plan a recreation experience to meet his desires and expectations and to avoid the pitfalls that can degrade or ruin a vacation. Such information may include history and geology information, names and locations of specific mountains and glaciers, fishing information such as types, locations and access, wildlife information, and points of interest along the highway. Information is also needed during the visit to orient the visitor to where he is, dangers he may face, what he may need to take along, road and weather conditions, and services available. The more information a visitor has about an area, the better he can take advantage of opportunities and thus make the visit even more enjoyable.

Safety - A safe trip is essential to an enjoyable trip. Examples of information that may help lead to a safer trip include road and weather conditions, where first aid and medical attention is available, and the do's and don'ts of backcountry hiking.

Services - Information on visitor services is important to an enjoyable and a safe trip. Information should include where food, lodging, propane and gasoline may be obtained, where and what types of automobile repairs can be made, and where fishing and hunting guide services can be obtained along the highway.

Awareness - Information, related through interpretation, increases a visitor's knowledge and understanding of the natural resources of an area. Such knowledge enriches and helps instill in the visitor a sense of land ethic and respect for nature, to ultimately help protect and conserve the area's natural resources.

The Denali area needs a visitor information plan because it is easily accessible, yet it is remote. It is used for a variety of recreation activities, yet most recreationists are not well acquainted with the area. Its beauty and versatility, which include outstanding examples of mountain scenery, glaciers, and wildlife, make the Denali area worthy of an information plan that will give the visitor an informative and satisfying experience, and will inform him of the recreational opportunities available. The wild and rugged nature of the area dictates that information should be made available so that users can avoid dangerous or otherwise annoying situations which could ruin a visit.

The Planning Area

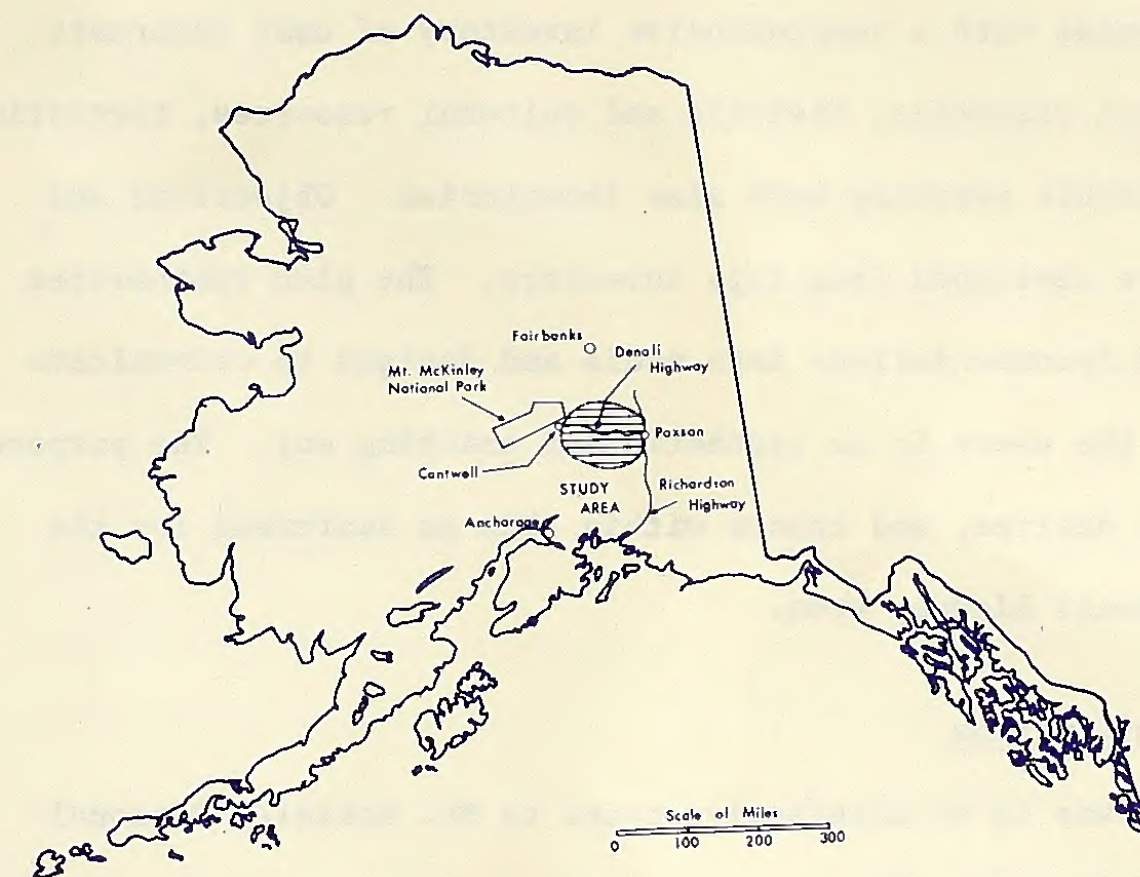
The Denali Highway, located in south-central Alaska, midway between Fairbanks and Anchorage, runs in an east-west direction mostly at or above treeline for a distance of 135 miles between Paxson on the Richardson Highway, and Cantwell on the Anchorage-Fairbanks Highway. Approximately 20 miles of the highway is paved from Paxson westward to Tangle Lakes. Paxson is approximately 2,650 ft in elevation, while Cantwell is 2,190 ft above sea level. The highway crosses a variety of terrain as it traverses the south flank of the Alaska range. It is the highest highway in Alaska as it crosses Maclaren summit at an altitude of 4,086 ft.

Several major drainage systems are encountered along the highway; the Gulkana River flows west of Paxson, into the Copper River which drains into Prince William Sound; the Susitna River system drains into Cook Inlet near Anchorage; and the Nenana River flows into the Tanana which flows into the Yukon and then to the Bering Sea.

A striking characteristic of the Denali Highway corridor is the topographic variation ranging from 13,032 ft Mt. Hayes and 12,339 ft Mt. Deborah of the Alaska range down to approximately 2,000 ft along the Susitna and Nenana River. Variations in topography lend scenic grandeur and provide travel interest with unequaled vistas along the Denali highway at altitudes mostly at or above tree line. The magnificent Wrangell Mountains can be seen from the eastern end of the roadway, with the high peaks of the Alaska Range to the north. Mount McKinley at 20,320 ft is the most imposing of all Alaskan features and can be viewed at several points near the Denali's western end. Topography to the south consists of mountains of lower elevations and the river valleys of the Maclaren, Susitna and lesser streams that drain south into Cook Inlet.

A number of impressive glaciers, the Maclaren, Susitna, West Fork, and Gulkana, are visible at several points along the Denali Highway.

The Denali Highway acts as an important midpoint of two recreation "loops" serving Anchorage and Fairbanks. The Fairbanks loop runs south, down the Fairbanks-Anchorage Highway to Mt. McKinley National Park, across the Denali Highway and back to Fairbanks via the Richardson Highway. The Anchorage recreation loop begins at Anchorage and extends north up the Fairbanks-Anchorage Highway to Mt. McKinley National Park, then turns east tranversing the Denali Highway to Paxson and then south to Anchorage via the Richardson and Glenn Highways.



MAP 1
Study Area Location

INVENTORY OF RESOURCES

An information plan for an area such as the Denali Highway requires an extensive inventory to build a data background for the area. This data creates an understanding of and a "feel" for the area. It identifies existing resources of the area, what resources are outstanding, the interests of the using public, and what information the public needs in order to be informed about the area. This data also acts as an information base from which decisions and recommendations can be made on what should be included in this information plan. When decisions and recommendations have been made and a plan has been developed, information can then be selectively taken from the inventory data base and used for actual message content and wording.

The inventory of resources for the Denali area included a thorough library search for references, discussions with knowledgeable individuals, extensive field surveys including study of aerial photos, low altitude observations, USGS topo map study and on-site examination of specific resources. Inventories were done of highway users and residents, natural and recreational resources of the area, historic and cultural resources, and visitor services available along the Highway. A detailed discussion of the findings of each of these inventories follows.

User Inventory

The public information plan for the Denali Highway area and any other area should be based upon the interests of the users of the area. User input into the plan should come from both the visitor and the local resident. The following is a synopsis of information desired by over 360 users of the Denali Highway.

The purpose of presenting this data is to identify the public information interests and needs of the highway users. This information has been applied to help identify and establish areas of emphasis in the final public information plan for the Denali Highway area.

User Desires

Table 1. General Desired Information--Major Categories

Rank ordering of information desired-- most to least	# of respondents wanting information	% of all respondents wanting information in each category
Natural features	151	42%
Recreation opportunities	129	36%
History and culture	115	32%
Road conditions	90	25%
Other services	75	21%
Accommodations	39	11%

Each person interviewed was asked: "Was there any information that you did not have before or during your trip that would have helped to make your trip more enjoyable?" Road conditions, accommodations, natural features, history and culture, recreation opportunities, and other services were suggested response categories. General response for all categories was that two out of three visitors to the Denali area wanted information.

When positive response for each category is analyzed it becomes apparent that information in all but one category (accommodations) is important to large numbers of people utilizing the Denali Highway area.

Approximately two out of every five people traveling the Denali Highway want information on natural features followed closely by information on: recreation opportunities--more than one out of every three, history and

culture--one out of three, road conditions--one out of four, and other services--one out of five. Information on accommodations was of far less importance, yet one out of ten people desired this type of information.

In order to identify specific areas of interest, each person responding positively to a category was asked for an open-end response on specific information he or she would like under that category. For example, if a person responded that he would like information on recreation opportunities, he was then asked what types of recreation information he would like. He may have responded--the types and location of fishing. This response would have been recorded by the trained interviewers under fishing as both type and location.

A multitude of responses was received. Over 100 different items of information were desired by visitors. Only specific information receiving a relatively large percent of response for any one category is displayed in the following table. An example of how to interpret Table 2 is that 52% of all visitors desiring information on natural features, desired information on the geology of the Denali Highway area.

Of those people desiring information on natural features, the majority were interested in the geology of the area. Almost double the number of people were interested in geology than were interested in the next closest category which is wildlife. The only other category which received interest was vegetation.

Of all the potential recreation opportunities in the Denali Highway area, only information on fishing, scenery and trails was desired. Type and location of fishing were desired by large percentages of people. Information on trails was desired by a significantly smaller number of people.

Table 2. Specific Desired Information by Categories

<u>Natural features</u>	<u>% of those wanting information</u>
Geology	52%
Wildlife	37%
Vegetation	21%
<u>Recreation opportunities</u>	<u>% of those wanting information</u>
Fishing	
Locations	44%
Types	38%
Vista points	26%
Scenic pull-offs	23%
Foot trails	14%
<u>History and culture</u>	<u>% of those wanting information</u>
Native history	49%
Gold rush	34%
Mining today	18%
<u>Road Conditions</u>	<u>% of those wanting information</u>
General condition--gravel, etc.	64%
<u>Other Services</u>	<u>% of those wanting information</u>
Gasoline and propane	83%
Repairs	36%
<u>Accommodations</u>	<u>% of those wanting information</u>
Other campgrounds	46%

The majority of interest in history and culture centered around native history. This category received a much greater response than the next closest response which was gold rush.

The only information desired under road conditions was the general condition of the road. The interest seemed to be in knowing that the road was gravel, was rough and was generally in poor condition.

Of the few responses under the "other services" category, the greatest interest was in locating gasoline and propane, followed by some interest in where repairs can be found. One reason for the low response rate to this category is the private advertising which already exists along the highway.

The only specific information on accommodations desired by the highway users was for campgrounds without hookups.

All specific types of desired information have been rank ordered in the following table to show the relative importance of any one of the specific desired information variables to any other of the desired information variables.

Table 3 displays only 12 out of approximately 100 desired information variables listed by the Denali Highway users. The fact that around 100 variables were listed by interviewees shows that there are extreme individual differences in user preferences. This makes selection of the important variables for planning difficult. Not all user desires can be met. Fortunately, the variables listed in Table 3 did load heavier than all other variables, and fell nicely into a continuum, allowing rank ordering.

Table 3. Rank Ordering of Information Desired by Visitors to the Denali Highway Area

Total Number of Interviews - 360		
<u>Information Desired</u>	<u># of Visitors Desiring Information</u>	<u>Approximate % of Visitors</u>
1. Geology	80	22%
2. Gasoline	62	17%
3. General road condition	58	16%
4. Wildlife	56	15.5%
5. Native history	56	15.5%
6. Fishing locations	55	15%
7. Fishing locations	55	13.6%
8. Gold mining	39	10.8%
9. Vista point	38	10.5%
10. Vegetation	32	9%
11. Scenic pull-offs	29	8%
12. Repairs	27	7.5%

Therefore, from the standpoint of public input and public interest, the only information which seems to have any generalizable importance to the users are the 12 variables listed in Table 3. These are the variables which should receive major attention in developing the public information plan for the Denali Highway area.

Conclusions

Based upon the information from the users, the Denali Highway area plan emphasizes, in order of importance, the following general desired information categories: Natural Features, Recreation Opportunities, History and Culture, Road Conditions and Other Services. Furthermore, special emphasis is given to 11 specific variables starting with information on geology which is more important to many more users than is any other information.

Hopefully, the use of public input in the development of the Denali Highway Public Information Plan will lead to meeting public desires and subsequently to a more satisfying user experience.

Natural Resources Inventory

Geology

The most outstanding single feature of the Denali area is its geology. The high Alaska Range lies just to the north and west of the highway, featuring Mt. Hayes (13,382 ft), Mt. Deborah (12,339 ft), Mt. Moffit (13,020 ft) and, of course, the most spectacular of all, Mt. McKinley (20,320 ft). Other spectacular peaks in the Alaska Range that are 10,000 ft and over are Aurora and McGinnis peaks, Mt. Shand, Mt. Geist, and Hess Mountain. This portion of the Alaska Range has several large glaciers clearly visible from the highway. The Maclaren, Susitna, and West Fork glaciers add interest and variety to the Denali area's unique scenery.

The high range of the Wrangell Mountains, featuring the 16,237 ft volcanic cone of Mt. Sanford and 12,010 ft Mt. Drum are visible from the highway to the southeast.

To the south lie the Talkeeta Mountains and the river valleys of the Maclaren, Susitna and lesser streams. All along the highway a variety of glacial features are present; kettle and rock basin lakes, pingos, moraines, eskers and braided streams add interest and variety to the complex geologic picture of the Denali area.

Formation of the Alaska Range. The formation of the Alaska Range in the Denali area is a complex process spanning millions of years of geologic time. Although not completely understood, it is generally agreed that late Triassic seas and extensive volcanic activity preceded the formation of the Range. The area was then subjected to a broad regional downwarping of the earth's crust, called a synclinorium. Upon this synclinorium minor folds developed in the upper layers of the

earth's crust. During the early to middle Jurassic period large masses of crystalline igneous material intruded the minor folds of the synclinorium, and in combination with a series of thrust faults, formed the ranges in the Denali area. These large, intrusive bodies, or batholiths, now form the core of the Alaska Range to the north and the Talkeetna Mountains to the south of the highway (88:--). As is usual with this type of geologic formation, the younger cretaceous rocks are found near the center of the range with the older, paleozoic rocks on the flanks. Further evidence of crustal deformation occurs in the great longitudinal faults, such as the Denali fault system, that cuts the flanks of the Alaska Range and runs parallel to it (21:228). Sedimentary, volcanic and intrusive rocks of nearly all geologic periods are present in the Denali Highway area. Mineral provinces occur throughout the Alaska Range characterized mainly by copper, gold, silver, and molybdenum.

Glacial features. During the Pleistocene ice age the southern third of Alaska was covered by glacial ice. The ice scoured, eroded, and shaped the Denali area into nearly its present day topographical configuration. As the ice age subsided, the retreating glaciers left many deposits now visible along the Denali Highway. Most numerous of these deposits are the moraines in the Denali area. Moraines are composed of unstratified glacially deposited rock material (glacial till) laid down in low linear hills at the edges of glaciers. Good examples of glacial outwash plains, braided streams, and kettle and rock basin lakes can be seen from the highway. A braided stream has many intertwining channels separated from each other by low islands or channel bars. Such stream patterns are believed to indicate that the stream has an excessive load and is not capable of carrying on lateral erosion (21:229). Braided streams emerge from the Maclaren glacier to form the Maclaren River, the

West Fork glacier and Susitna Glaciers to form the West Fork and Susitna Rivers and from the Nenana glacier to help form the Nenana River. Braided channels in the Denali area develop as a result of increased deposition due to the sudden decrease in stream gradient when the stream leaves the mountainous terrain of the glacier and enters the lowlands at the foot of the Alaska Range.

Kettle and rock basin lakes can be viewed on both sides of the highway along most of its length. Rock basin lakes owe their existence to the tremendous gouging action of glaciers, forming in glacially scoured bed-rock basins. Kettle lakes are somewhat circular bodies of water formed in depressions in glacial sediment. These depressions, or kettles can be formed two ways: (1) a block of ice left by a shrinking glacier becomes buried by glacial rock debris. When the block melts, the overlying debris slumps downward, forming the depression or kettle. (2) A block of ice can be left just sitting on the glacial debris. When the ice melts, its impression left in the debris forms the kettle for the kettle lakes (88:--).

Several miles of the Denali Highway (between mile 48 and mile 51, and 58 and 60.5) are built upon a particularly interesting glacial feature known as an esker. An esker, simply defined, is a sinuous ridge composed of the deposits of glacial streams confined by walls of ice and left as a ridge when the ice disappeared (10:152). Eskers are composed of silt, sand, gravel and cobbles, making the Denali Highway eskers natural roadbeds. It is believed that the Denali eskers were used by ancient man as a convenient pathway across the area. Unlike the Denali eskers, most eskers in the United States have been leveled for their valuable gravel deposits. Therefore, the Denali eskers represent an excellent example of a natural glacial deposit not now present in most other states and unfamiliar to most visitors.

Geologically the Denali Highway is outstanding. Few finer examples of glacial features and mountain processes with public access can be found in the United States today.

Vegetation

Several vegetative ecosystems are found along the Denali Highway, presenting the traveler with an outstanding opportunity to observe unfamiliar plant life. Such diversity also provides a potential for interpretation of both plants and the ecological interrelationships dictated by different vegetative types. Vegetation not only plays a key role in determining the life zones for different species of animals, but also has a major visual impact by affecting the scenics of the Denali area.

Vegetation along the highway and in the immediate area varies widely, with seven of the nine ecosystems defined for Alaska represented at some point along the highway. This diversity offers variety and interest to the traveler. The dynamic interaction of climate, soils, drainage, permafrost, exposure and rugged topography have resulted in a complex vegetative pattern for the area. Understanding the vegetative systems along the highway is essential to understanding the Denali area itself.

Five of the seven systems found in the Denali area--alpine tundra, moist tundra, high brush, low brush bog-muskeg, and bottomland spruce-popular forest—are dominant systems and occupy about 90 percent of the area. The low brush system dominates the eastern two-fifths of the area along both sides of the highway from Clearwater Creek east to Paxson. Large patches of alpine tundra and barren ground are also found in this eastern two-fifths, primarily in the Amphitheater Mountains directly north of the highway. The western three-fifths of the Denali area is dominated by four major vegetative ecosystems: alpine tundra-barren ground, moist tundra, high brush, and bottomland spruce-poplar forests. These systems are widely interspersed with each other from Clearwater Creek west to Cantwell. The vegetation map located on page 11 will help the reader locate and identify the major vegetative ecosystems found along and around the Denali highway.

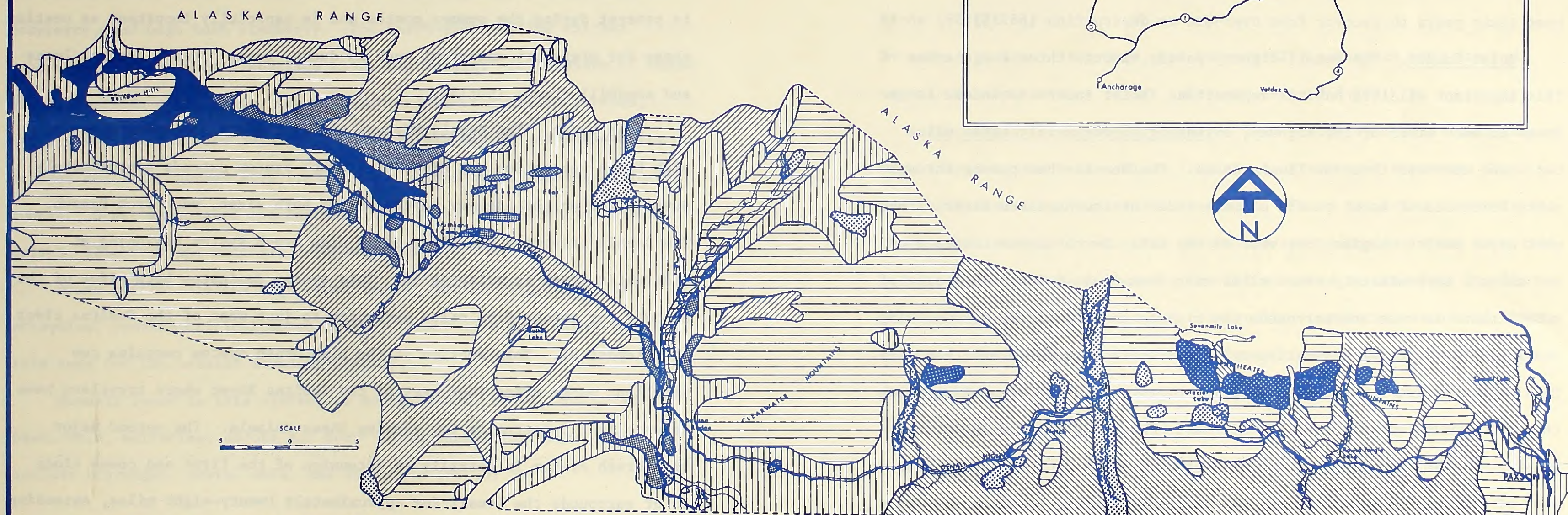
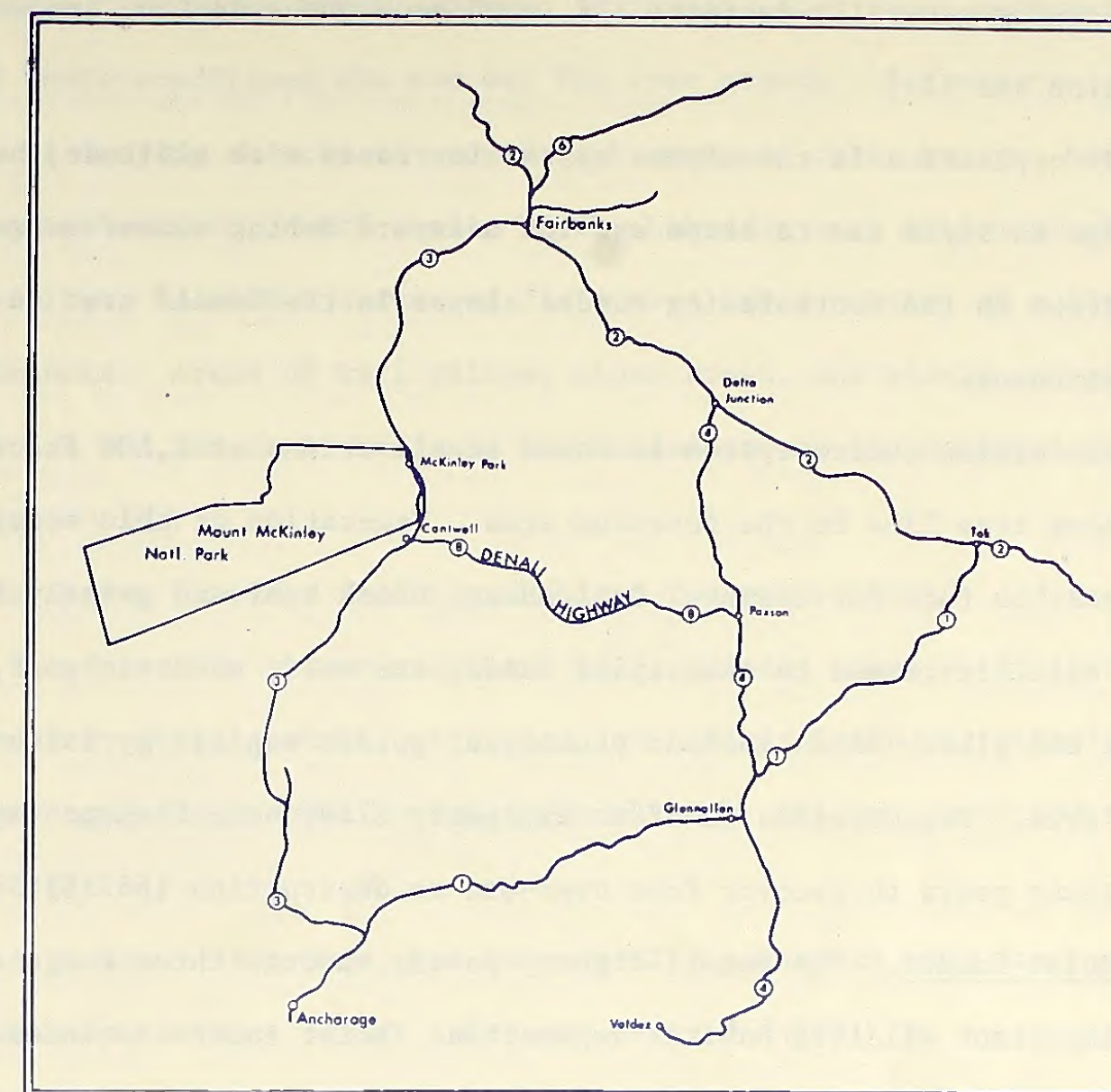
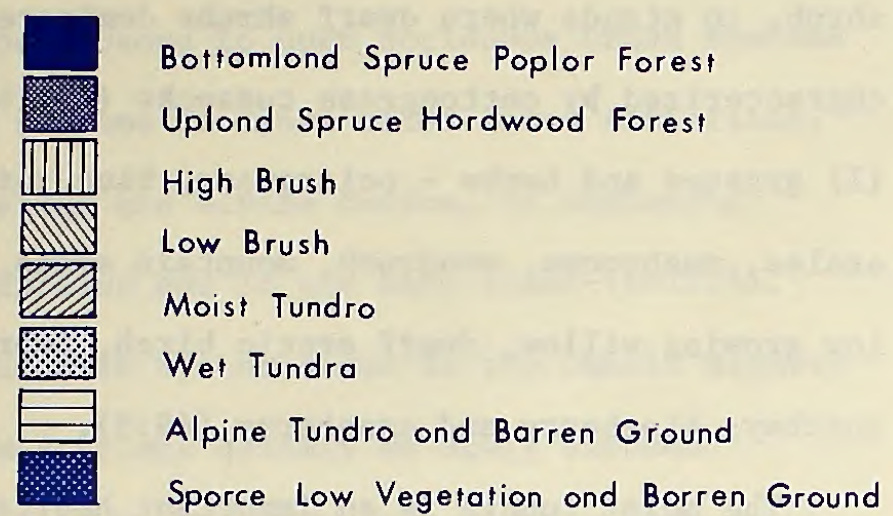
Alpine Tundra. The Denali Highway passes through several short stretches close to this system at several points along its route. About seven miles west of the Tangle Lakes area and extending to just east of the Maclaren River the highway passes through about 12 miles of the amphitheater mountains tundra system. It is along this stretch that Maclaren summit (4086 ft), the highest point on any Alaskan highway, is found. At this point the visitor can observe typical examples of Alaskan alpine tundra. Just east of the Maclaren River and extending about seven miles westward, the highway traverses the narrow Crazy Notch alpine tundra system. The Denali then passes through alpine tundra south of the Clearwater mountains for a distance of 17 miles from just west of Clearwater Creek at milepost 60 to just east of the Susitna River at milepost 77. The last section of highway that passes near or through the alpine system extends about 10 miles from milepost 112 to milepost 123. Here the highway is in close proximity to the Nenana River and passes through and then north of the Talkeetna Mountain tundra system.

Alpine tundra consists of barren rocks and rubble interspersed with low plant mats, both herbaceous and shrubby. White mountain avens are dominant in the Alaska Range and may cover entire ridges and slopes along with many low growing herbs such as moss-campion, black oxytrope, arctic sandwort, and several lichens, grasses and sedges. Associated species are resin birch, dwarf arctic birch, cassiope, cranberry, alpine azalea, labrador tea, mountain heath, rhododendron, arctic willow, dwarf blueberry, and mountain cranberry (68:15).

Except for mining, man's activities in this system are usually of short duration and are generally for hunting, mountaineering or other forms of recreation. Shelter and fuel are scarce, while groundwater is virtually

DENALI HIGHWAY VEGETATION

Legend



MAP 3

nonexistent. The growing season is short and except for inversions, temperatures generally decrease 3°F, with each thousand foot increase in elevation (68:15).

Precipitation in the alpine system increases with altitude, but drainage is rapid due to slope and low moisture during summer seasons. Permafrost on the south facing tundra slopes in the Denali area is usually discontinuous.

The alpine tundra system is found at elevations of 2,500 ft or more and above tree line in the forested area. Vegetation of this ecosystem is important as food for caribou, Dall sheep, black bear and grizzly bear. Other wildlife common to the alpine tundra are wolf, mountain goat, coyote, marmot and pika. Birds include ptarmigan, golden eagles, gyrfalcons and snowy owls. Regeneration is often extremely slow; some lichens may require over sixty years to recover from over-use or destruction (68:15).

Moist Tundra. The Denali Highway passes through three large areas of this important wildlife habitat vegetation. Moist tundra dominates large areas on both sides of the highway, extending approximately seven miles both east and west from the Tangle Lakes. The Denali then passes through short stretches of moist tundra on both sides of the Maclaren River. The next major stretch begins just west of the Crazy Notch alpine tundra zone and extends approximately seven miles west from Crazy Notch. This area of moist tundra is vast and surrounds the highway on both sides, encompassing small patches of other vegetative types (refer to vegetation map, page 11). This area of moist tundra contains prime migratory waterfowl nesting areas that are readily visible from the highway. The third major expanse of moist tundra in the Denali area begins about 9 miles up the highway just west of the Susitna River and extends for approximately 16 miles west on

both sides of the Denali. It covers a large area south of the highway and encompasses two small patches of alpine tundra.

This low growing system usually forms a complete ground cover and is extremely productive during the growing season. Composition varies from almost continuous cottongrass with a sparse growth of sedges and dwarf shrub, to stands where dwarf shrubs dominate. This system is generally characterized by cottongrass tussocks (68:14). Associated species are: (1) grasses and herbs - polargrass, blue joint, hairgrass mosses, alpine azalea, mushrooms, woodrush, mountain avens, and bistort; (2) shrubs - low growing willow, dwarf arctic birch, Labrador tea, green alder, lapland rosebay, blueberry and cranberry (69:9).

The moist tundra is an important habitat for mammals such as the grizzly bear, wolf, caribou, moose and fox. Surface water in this system is present during the summer months and is especially important as nesting areas for migratory waterfowl such as ducks, geese, swans, grebes, loons and sandhill cranes (68:14).

High Brush. The Denali Highway passes through two major areas of high brush vegetation. A minor high brush system extends approximately seven miles up the highway, encompassing both sides, west from Paxson. The Denali traverses the first major high brush system beginning at Clearwater Creek at milepost 56. This system dominates both sides of the highway for twenty-five miles extending to just west of the Susitna river at milepost 81. This section of the high brush system contains two excellent moose areas just east of the Susitna River where travelers have an excellent opportunity for viewing these animals. The second major high brush system is actually an extension of the first and comes close to or surrounds the Denali for approximately twenty-eight miles, extending

from west of the Susitna River to seven miles west of Brushkana Creek at milepost 111. This is an extensive high brush system encompassing a large portion of the Monahan flats north of the highway. Excellent waterfowl viewing areas are available to the traveler along this stretch of the highway and there is a chance of observing caribou.

The dominant species in these dense to open deciduous brush systems range from dense willows along streams to dense alder above timberline. This system occurs between treeline and alpine tundra, in avalanche paths through forests, on floodplains and in old burn areas (66:128).

Two subsystems of the high brush system occur in the Denali Highway area. The floodplain subsystem develops quickly on newly exposed alluvial deposits and reaches a height of 15-20 ft. The dominant shrubs are willows and alders. Associated shrubs are dogwood, prickly rose raspberry, and high bush cranberry. The birch-alder-willow thicket subsystem is found near timberline along the Denali. It consists of resin birch, American green alder, aspen, birch and several willow species, usually forming thickets 5-15 ft tall. Thickets may be extremely dense, or open and interspersed with lichens, low shrubs or patches of alpine tundra. Other associated species are Sitka alder, Labrador tea, Alaska spirea, blueberry and mountain cranberry (69:6-7).

Brush thickets in the high brush system, either fire-caused or otherwise, provide critical moose forage. Bears also make heavy use of this zone for the usually abundant berries.

Mammals found in this system are moose, black, brown, and grizzly bear, wolf, wolverine, coyote and fox. Birds inhabiting high brush include ptarmigan, hawks, owls, and songbirds (68:15).

Low Brush Muskeg-bog. This system is common on both sides of the highway from Clearwater Creek eastward to Paxson. Low brush muskeg-bog is found where conditions are too wet for tree growth. Bog vegetation consists of varying amounts of sedges, sphagnum and other mosses, bog rosemary, resin birch, dwarf arctic birch, Labrador tea, willow cranberry and blueberry. Localized saturated flats have large patches of cotton-grass tussocks. Areas of tall willow, alder brush, and widely spaced dwarf spruce and tamarack are found within and around the marginal higher portions.

This system provides important habitat for moose, ducks, and geese. Mammals found in this system are black bear, grizzly bear, wolf, caribou, moose, beaver, mink, muskrat, otter and fox. Birds include: ptarmigan, ducks, swans, geese, sandhill cranes, marsh hawk, falcons, owls and shore birds (68:17-18).

Surface water is common, but is generally saturated with iron organic substances that affect color and taste (68:18).

Bottomland Spruce-Poplar Forest. This ecosystem occurs along the Denali Highway and Nenana River from the confluence of Brushkana Creek and the Nenana River westward to Cantwell. It is not found elsewhere in the immediate Denali area. The bottomland spruce-poplar forest is a tall, relatively dense forest system primarily of white spruce mixed locally with cottonwood or balsam poplar. Generally, commercial stands of white spruce are on level to nearly level floodplains and low river terraces (68:16), however, white spruce along the Denali is not of commercial quality due to the high altitude and harsh conditions of the area.

Cottonwood and balsam poplar usually occur with white spruce as a successional system. They are replaced at maturity by white spruce.

Both cottonwood and poplar invade floodplains and deglaciated valleys and grow rapidly (69:3).

Undergrowth is generally dense, consisting of high and low shrubs, including American green alder, thinleaf alder, willow, roses, dogwood, Labrador tea and berry bushes. The forest floor is usually carpeted with ferns, bluejoint, fireweed, horsetails, lichens, herbs and mosses (69:3).

This system provides good habitat for fur bearers such as beaver and red fox, for woodland game birds like the spruce grouse, for many small mammals and for large mammals such as moose in the bordering or included brushy areas. Other mammals inhabiting this system are black bear, grizzly bear, wolverine, showshoe hare, coyote, mink, weasel, land otter, squirrels and mice. Birds include grouse, ravens, songbirds, bald eagles, hawks (including osprey) and woodland owls (68:16).

The two remaining vegetative systems of the Denali area are not present to the extent of the other five, but nevertheless warrant discussion.

Upland Spruce Hardwood Forest. The majority of this system is found at the western end of the highway upslope from the bottomland spruce poplar forests of the Nenana river. Other small segments of this system are found scattered throughout the area from the Susitna River west.

The upland spruce hardwood forest ecosystem is a fairly dense forest composed of white spruce, birch, aspen and poplar. Black spruce typically grows on north slopes and poorly drained flat areas. Root depths are shallow. White spruce occur in mixed stands on south facing slopes and well drained soils, but form pure stands near streams (68:16).

Undergrowth consists of mosses with grasses on drier sites and with brush on moist slopes. Brush zones and the brushy young tree stages

occurring after fires furnish especially good moose browse and are good hunting areas (68:17).

Mammals found in this system are black bear, grizzly bear, wolf, wolverine, caribou, moose, coyote, and fox. Birds include: ptarmigan, hawks, owls, spruce and ruffed grouse, and songbirds (68:17).

Soils are generally stable underlain by discontinuous permafrost. Surface water is usually available during summers (68:17).

Wet tundra. The major portion of this system encompasses a narrow strip on both sides of the Maclaren River throughout its course in the Denali area. Scattered small segments of wet tundra occur throughout the area from north of the West Fork River eastward to Glacier Lake.

The wet tundra system of the Denali area is found in localized segments of little topographic relief. Standing water is almost always present in summer and numerous shallow lakes are common. Dominant vegetation is sedge and cottongrass, usually forming a mat rather than tussocks. Rushes, lichens, mosses, liverworts, mushrooms and other fungi are also present. A few woody and herbaceous plants, such as willow, bog cranberry, dwarf birch, and shrubby cinquefoil occur on the drier sites above the water table (68:14).

This system produces significant amounts of forage for caribou and moose and is an important habitat for waterfowl, muskrat and land otter. Mammals found in wet tundra are grizzly bear, wolf, wolverine, mink and weasel. Birds include: ptarmigan, ducks, geese, swans, marsh hawks, owls and shorebirds (68:14).

The diversity of vegetative types in the Denali Highway area provide interest not only by influencing the visual impact of the corridor, but

also by producing a wide variety of wildlife and game. The visitor has a unique opportunity to experience vast areas of alpine tundra, a system not familiar to most. Denali area vegetation is such an integral part of the total scene along the highway that it is of utmost importance that the Denali visitor be informed of this important natural element.

Wildlife

A common misconception about wildlife in Alaska is that it is abundant everywhere, that large herds of moose, caribou and deer can be seen at a glance, that bear and woodland game are common in the forests, and that Dall sheep and mountain goat exist in large herds throughout the high country. Such expectations brought to Alaska by the outsider will lead to disappointment because game is not present in unlimited quantities. (See Wildlife maps, pages 17 and 18 and Table 4, page 26, Denali Area Vegetative Systems and Associated Wildlife.)

Alaska is a harsh land of long cold winters and much open, barren ground. The competition for range and forage is intense and has an immense impact on limiting wildlife populations. Extremely hard winters can result in the death of hundreds of herd animals, especially the young and very old. This reduces the breeding stock for several years which serves to reduce the overall population of the herd. Natural predation also takes its toll, but all of these population reduction causes are natural and can be absorbed, often to the benefit of a herd. The impact of man, however, is difficult to overcome by animal populations and is often harmful for man takes prime animals from the herd. The Denali Highway area is a good example of this.

This area has been considered one of the outstanding hunting and wildlife regions in Alaska over the years, but in recent years the wildlife have been greatly depleted. Denali residents have particularly noted a serious decline in caribou and moose populations, which brings about corresponding declines in species such as the wolf. The game reputation of the area has resulted in heavy hunting pressures, especially on caribou and moose. These two species are the easiest and least expensive to hunt and have been a traditional favorite of hunters. At least one local resident, however, Dr. Huffman, attributes a majority of the blame for moose and caribou reductions to past hunting policies of the state. He recalls that the caribou season of 1967 extended from August 1967 until April 1968, with a limit of three caribou per hunter. "This," says Huffman, "caused the needless slaughter of caribou that were just left to lay because hunters wanted to get their limit (89:--)."

Moose also have fallen prey to the hunter and are not seen in their former numbers. The game policies of the late 1960's took their toll when an antlerless moose season was declared and hundreds of cow moose were taken from the Denali and surrounding areas. This action has resulted in a reduced moose population today.

Man has not been the only cause of caribou and moose population reductions in the Denali area. Natural predation, the exceptionally harsh winter of 1971-72 that caused the starvation of many animals, and the over population of years past leading to range deterioration, have all had their impact in reducing the caribou and moose populations of the Denali region.

The Nelchina caribou herd of the Denali area once numbered 70,000 animals. Until about fifteen years ago this herd would take up to three

days and nights for their numbers to cross the Susitna River (89:--).

Today the herd totals about 10,000 and is seen crossing the Susitna in small, scattered groups.

Despite all this the Denali area remains as one of Alaska's finest game regions. Visitors still have a chance of seeing moose, caribou and many other wildlife species along the highway (see Wildlife Maps, pages 17 and 18).

Caribou. Caribou are seasonally distributed throughout the Denali area from upland tundra to mountainous terrain. During the summer months caribou stay in the high hills and mountains and are often found at elevations as high as those inhabited by Dall sheep. They seek snow patches and cool breezes to escape the biting nose flies, mosquitoes and warble flies that continually harass them (82:--). The caribou are migratory animals that remain in the high country of the Talkeetna Mountains and Alaska Range until the first snows of September drive them down. Caribou in the Denali area winter in the sheltered, lower elevations such as Monahan Flats and Lake Louise to the south where food is easier to find. Caribou migration routes often change and are never certain. Areas known for many years to have great numbers of caribou may suddenly be abandoned as the herd changes its migration pattern (53:--).




All caribou are considered to represent a single species. Alaska has only the barren-ground subspecies, but east of the Rocky Mountains, in Canada, barren-ground and woodland caribou may be found. The barren-ground caribou generally inhabit open tundra lands near or above timberline, making the Denali area an important caribou range (53:--).

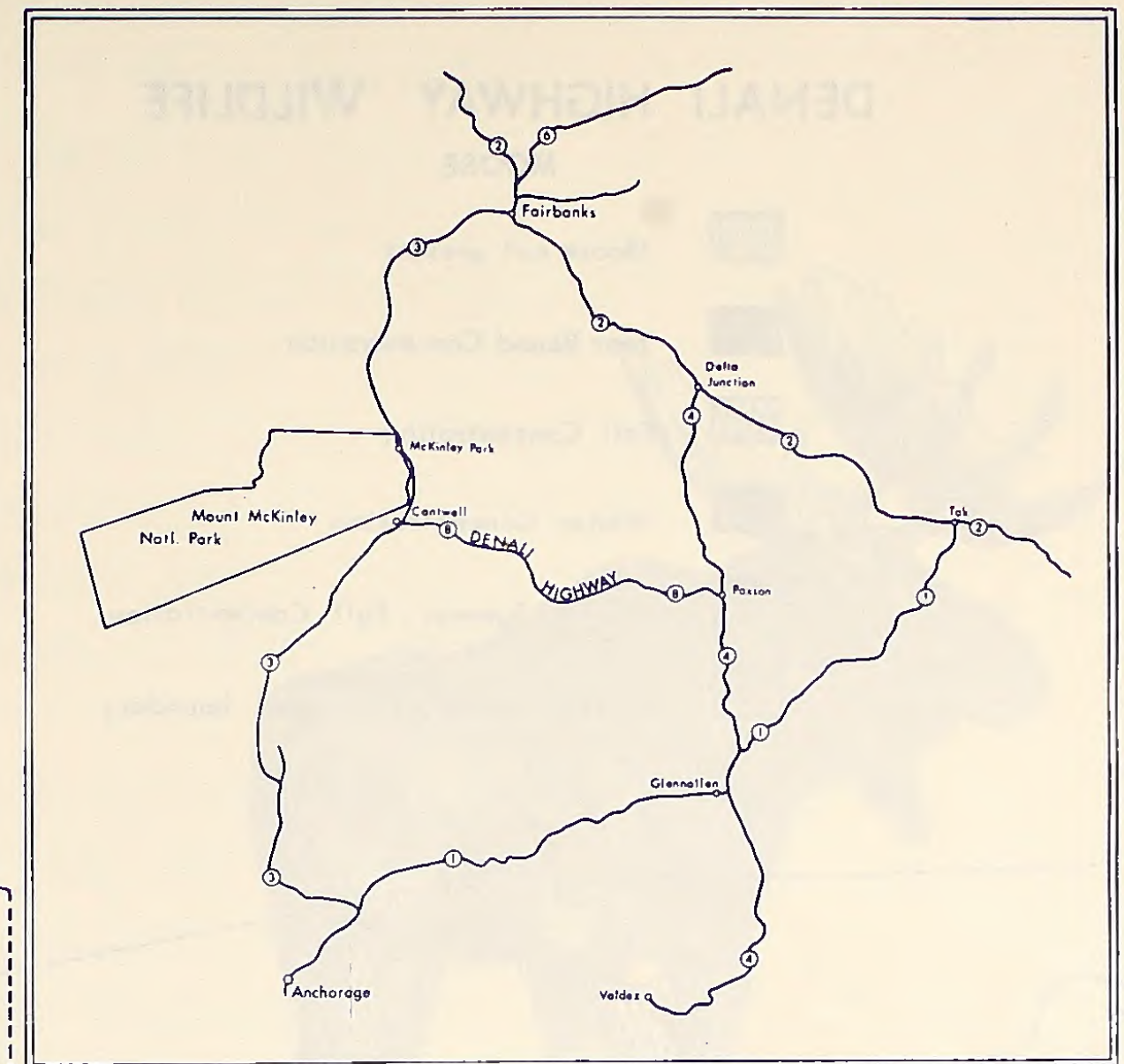
Like most herd animals, caribou must keep moving to find adequate food. They are not as likely to starve to death as moose or deer because if food



DENALI HIGHWAY WILDLIFE







CARIBOU & DALL SHEEP

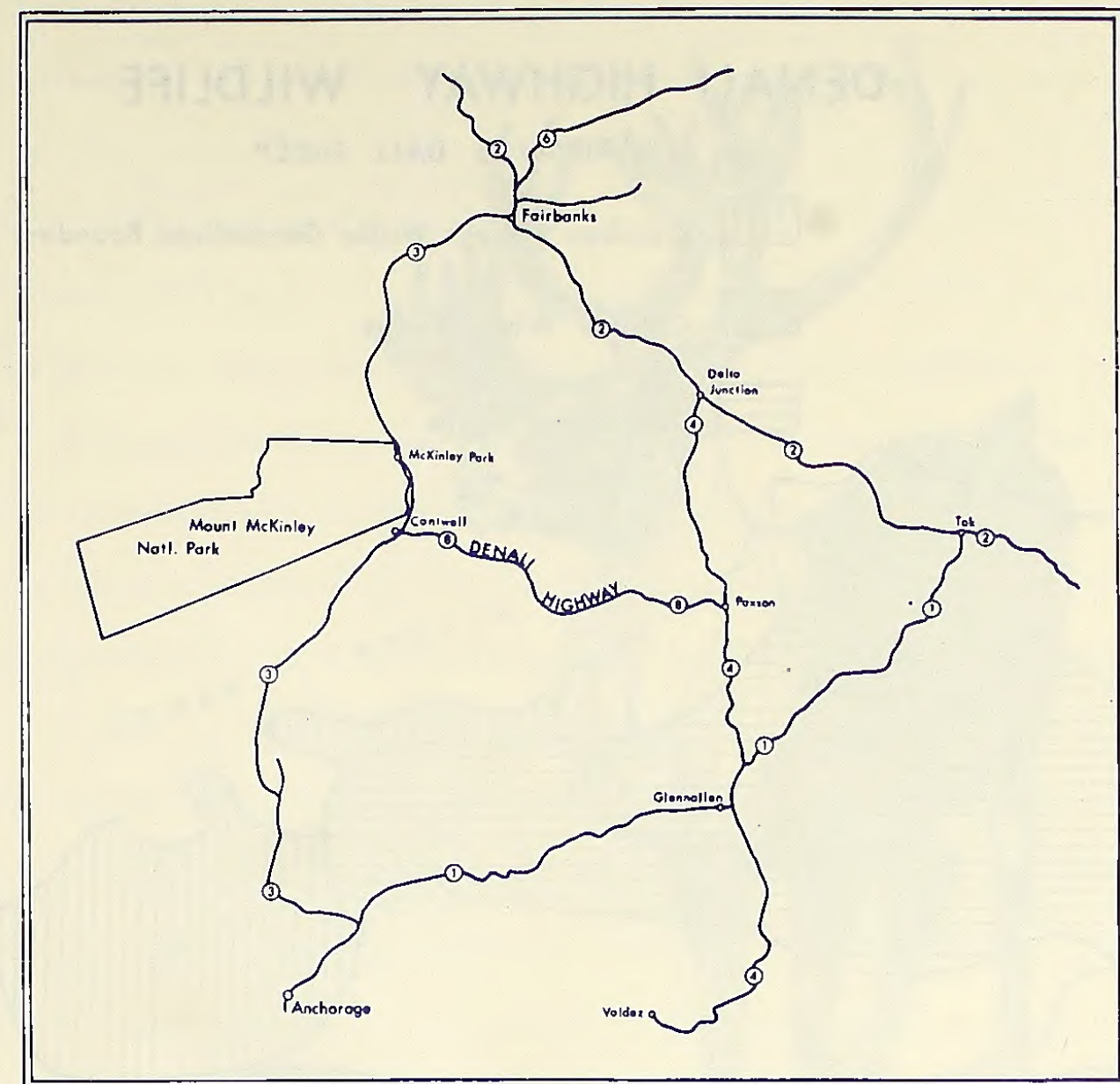
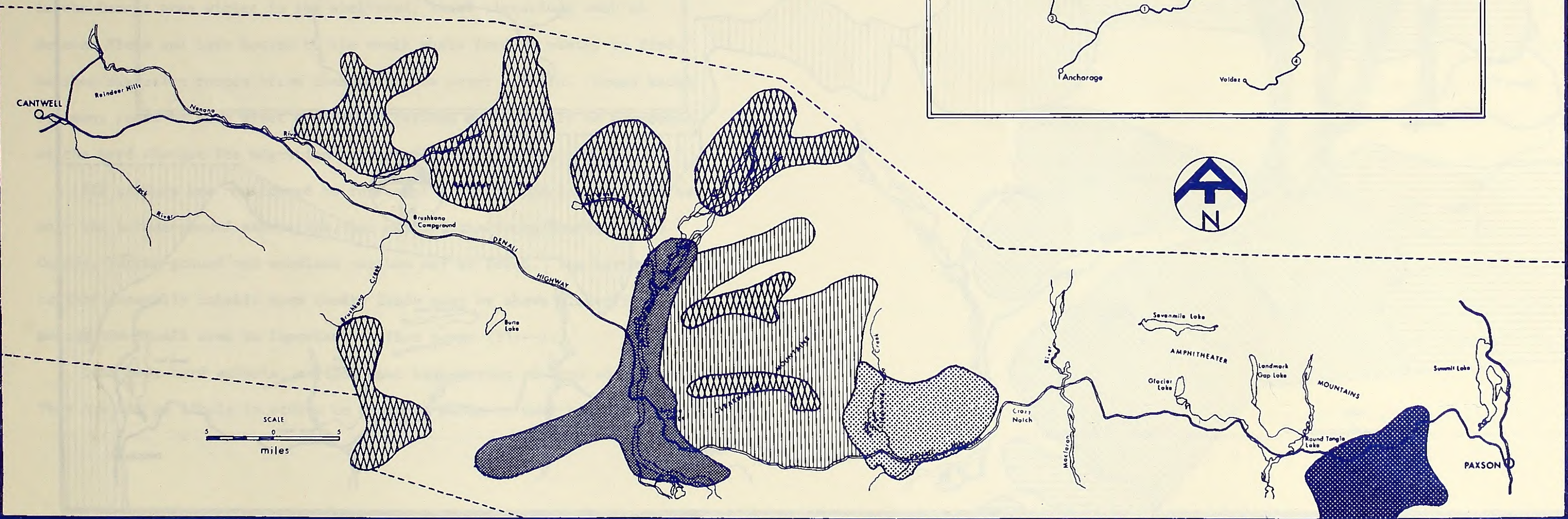
-  Caribou Present Within Generalized Boundary
-  Caribou Winter Range
-  Dall Sheep Range



DENALI HIGHWAY WILDLIFE

MOOSE

-  Moose not present
-  Year Round Concentration
-  Fall Concentration
-  Winter Concentration
-  Spring, Summer, Fall Concentration
-  Present within generalized boundary



MAP 5

is not available in one area, they move to another. During the summer caribou eat a variety of plants, preferring willow and dwarf birch leaves, grasses, sedges and succulent plants. As autumn frost kills plants and foliage, they switch to lichens and dried sedges existing on these foods throughout the winter (53:--).

Moose. Although not present in their former numbers, moose can still be seen along the Denali Highway. The Alaskan moose is the largest member of the deer family, and the largest of all moose (60:--). They are found in every vegetative ecosystem along the highway except high alpine tundra.

Moose can be colored a variety of browns from pale yellow to almost black, depending on the season and age of the animal. Newborn calves weigh 28 to 35 pounds, and grow to over 300 pounds within five months. Adult males range from 1000 to 1600 pounds, while adult females weigh 800 to 1200 pounds. Only the bulls have antlers. The largest moose antlers in North America come from Alaska. Moose produce trophy-size antlers at 6 or 7 years of age, and may continue to produce large antlers until they are 13 or 14. In the wild, moose may live just over 20 years (60:--).

During the fall and winter moose eat huge quantities of willow, birch and aspen, and may establish a browse line 6 to 8 ft above the ground by clipping all the terminal shoots of favored food species. In spring and summer they feed on a variety of foodstuffs, particularly sedges, equisetum (horsetail), pond weed and grasses. The leaves of birch, willow, alder and aspen are also important summer food (60:--).

Good areas to see moose along the Denali Highway are in the major river basins of the Nenana and Susitna Rivers. An exceptionally fine moose area exists in the marsh land just east of the Susitna River at



mile 79. Here the traveler has a fair chance of seeing a moose, but the best chance for viewing moose exists in the back country away from the road.

Dall sheep. The Dall sheep is undoubtedly one of the most valued of Alaskan species. A snowy white, full curl ram is a prized trophy animal for hunters. Dall sheep in the Denali area primarily inhabit the high mountains north of the highway and both north and south of the highway near its west end. Here, the combination of open alpine ridges, meadows, and steep slopes with precipitous and rugged terrain provide excellent sheep habitat. These elusive high country animals are seldom found below timberline (57:--). The Denali traveler will rarely see Dall sheep unless he hikes the mountains they inhabit and has a bit of luck.

Other Dall sheep rams have massive curling horns, while ewes and young rams have short, slender, slightly curled horns. These horns, like claws, hooves, and fingernails, grow from the skin, and are composed of keratin, quite different from the bony antlers of deerlike animals. Horns continue to grow throughout the life of the sheep while antlers are shed and regrown annually. Sheep horns grow in a corrugated pattern of annual rings, resulting from annual periodic slowdowns of growth during the winter months. As rams mature, their horns grow in an ever increasing curl, reaching a 3/4 curl in four to five years, and a "full curl" in seven to eleven years. A Dall sheep must have at least a 3/4 curl horn before it can be legally hunted in Alaska (57:--).

Black bear. The black bear is present in most major habitats along the highway from alpine tundra to low brush-bog muskeg. They are most often associated with the forest, but depending on the season of the year, they may be found from sea level to alpine forest. The black bear has two



natural enemies in Alaska: man and the grizzly bear. Man cannot be dealt with by the black bear, but for problems involving grizzlies, the black bear has a simple solution--he climbs a tree! Since grizzlies do not climb, it is an effective defense against this enemy and is at least part of the reason why black bears are not often found above timberline.

Black bears are the smallest of North American bears. Adults stand about 26 inches at the shoulder and measure about 60 inches from nose to tail. An adult male weighs an average of 180-200 pounds. Females are somewhat smaller than males. Three color phases are found in the Denali area. Black is the most common color but brown or cinnamon bears are often in south-central Alaska including the Denali area. All black bears, regardless of color phase have a brown muzzle, while most blacks have a patch of white hair on the front of their chest (56:--). Black bears may be seen at a number of points in the summer along the Denali highway, but they are most often encountered by the visitor at places close to human habitation. They sometimes become pesky garbage can marauders at Tangle Lakes and Brushkana Creek campgrounds.

Black bears will eat most anything that is available, but they do follow certain food seeking patterns. In spring, freshly sprouted green vegetation is a main food, but winter killed animals will not be passed up. Feeding habits shift to salmon when they become available in areas where they occur. Different types of berries, especially blue berries are an important summer and fall food item. Both black and grizzly bears are cannibalistic on occasion (56:--).

Grizzly bear. Brown or grizzly bears occur throughout the Denali area and Alaska, except for some of the Coastal and Aleutian Islands.

Until recently, brown and grizzly bears were listed as separate species, but are now classified under the single species, Ursus arctos (52:--).

Brown bear in popular usage refers to members of this species found in coastal areas, while those found inland are commonly called grizzly. The major distinction is that coastal brown bears are sometimes larger than interior grizzlies. The grizzly resembles its close relative, the black bear, but is usually larger, has a more prominent shoulder hump, and longer straighter claws. Other characteristics such as the shape and relative massiveness of the head, help to differentiate these species. Color is not a dependable means of identifying the grizzly from the black bear for both have many color phases. Black bears occur in many hues of brown, while grizzlies range in color from dark brown to blond (52:--).

The grizzly bear is a massive creature, commonly weighing from 325 to 850 pounds. Their long hair often has light colored tips giving the coat a frosty or "grizzled" appearance. Grizzlies will eat just about anything. Plants, insects, fish, ground squirrels, and big game are all normal foods. Berries, sedge, grass, horsetail, cow parsnip and the roots of many plants are also eaten. They are fond of carrion and will feed on carcasses of any animal they come across (52:--).

Grizzlies are found in all vegetative ecosystems of the Denali area and at all elevations, except the highest alpine tundra. Grizzlies will normally avoid humans in the wild, but it is advisable when hiking to avoid dense brush or tree thickets and to make lots of noise to let the bear know where you are traveling. They often visit the Paxson dump where as many as 13 have been seen at one time. They may be seen at various points along

the highway in the summer, especially in the higher altitudes. Grizzlies may also be found feeding on salmon along the Gulkana River at the Paxson end of the highway, during the annual salmon run in late June and early July.

Wolf. The wolf is common throughout most of Alaska and inhabits all vegetative ecosystems of the Denali area and all but the highest altitudes. Wolves are a member of the dog family, weighing between 25 and 115 pounds. Average weight of females is normally 10 to 15 pounds lighter than males. Individual color variation is great, ranging from black to off-white with many shades of grey between the two extremes.

Wolves are carnivorous and perhaps the most maligned creature in Alaska. Their principle food in the Denali area is moose and caribou, supplemented with berries, fish, water fowl, small mammals, sheep and goat. The wolf's natural habit of eating game species cherished by man contributes mightily to his adverse popularity (59:--). Although wolves are often a hated predator, they help control moose and caribou populations thereby reducing the possibility of over-population, range depletion, and mass starvation. Wolves, unlike man, do not deliberately choose outstanding physical specimens, but more often kill injured, diseased, or malformed animals, thereby improving the overall vitality and breeding stock of the herd. The real question then, is not whether wolves eat game, but what effect this has on the prey species (59:--). The effect is usually beneficial to the herd.

Wolves are highly intelligent animals, traveling hunting, feeding and operating as social units. Wolf packs are led by dominant individuals, and range in size from 2 to 25 animals. Wolf packs travel over considerable territory in search of food and the extent that they range seems to depend



upon the availability of food. Wolves are not thought to have exclusive territories, although some think that this is the case (59:--). In the Denali area wolves will seldom be seen by the traveler. Wolves usually stay clear of highways and other evidence of man.

Small mammals. In addition to big game species, many smaller mammals are found throughout the Denali area dependent on habitat preference. Furbearers include the wolverine, mink, beaver, muskrat, and otter and red fox. These animals are valued for their pelts and are heavily trapped in the Denali area. The coyote weasel, ground squirrel, red squirrel, lynx, marten, snowshoe hare, marmot and pika are other small mammals present.

Many species of birds and waterfowl find excellent habitat in the Denali area. Waterfowl can be seen in lakes and ponds all along the highway and include both diving and dabbling ducks, geese, grebes, loons, sandhill cranes, shorebirds and trumpeter swans.

Trumpeter swan. Until 1966 trumpeter swans were not known to exist in Alaska and were thought to be almost extinct. They were first discovered in the state in the Denali area and a few nesting pairs are present each summer (81:--). They may be seen in some of the lakes and ponds along the highway. Two particularly good areas to see trumpeter swans and other waterfowl are in the Tangle Lakes and in the small lakes and wetlands on either side of the eskers upon which the highway is built between mile 49 and 52.

Ptarmigan. Ptarmigan is the favorite game bird in the Denali area and can be seen almost anywhere along the highway. Good ptarmigan populations exist around Paxson Mountain southwest of Paxson,



Landmark Gap, Maclaren Summit at mile 35.2 and in the Tangle Lakes area during the winter (81:--).

Ptarmigan look like small grouse, except that their toes are feathered, their wings are white all year around and they have pure white body plumage in winter. They weigh from two-thirds to one and one-half pounds (62:--).

There are three kinds of ptarmigan and all are found in Alaska and the Denali area. The willow ptarmigan, rock ptarmigan and white-tailed ptarmigan live in high, treeless country, but there is usually a clear altitudinal separation of the three. Willow ptarmigan live closest to tree line and can usually be found in the last and highest stretch of willow along streams. Rock ptarmigan inhabit the middle slopes and low ridges, while white-tails are found among rocky screes and high ridges close to glaciers and snowfields (62:--).

Ptarmigan nest on the ground soon after the snow melts. Six to ten eggs are usually laid, incubated for three weeks, and then hatch in late June and early July. The male willow ptarmigan stays with the nest and does not hesitate to defend the brood. White-tails and rock ptarmigan leave the care of chicks entirely to the female. Chicks can get off the ground ten days after hatching and are able to fly well at eight to ten weeks (62:--).

In the fall ptarmigan form into flocks to migrate to their wintering grounds. Males winter at or just above timberline while females form their own flocks and winter below timberline. Ptarmigan flocks may get as big as several thousand birds. In the winter ptarmigan are quite social and feed and sleep close together in the snow. Winter diet consists of willow, alder, and birch buds and catkins. Buds and catkins are supplemented in the summer with various kinds of insects (62:--).

In the spring ptarmigan again move into the higher elevations in flocks, but then disperse widely, each cock staking out his own territory (62:--).

Bald eagle. During the 17th and 18th centuries the term "bald" was commonly used to signify white. For this reason, and because the adult bird's head feathers are white, the name "bald" eagle was retained. In its juvenile plumage, the bald eagle is dark brown and resembles the North American golden eagle (70:--).

Bald eagles generally nest on rock pinnacles in treeless areas, or in the upper third of older conifers, or large cottonwoods in stream bottoms. Tree nests are supported by a whorl of large branches or scraggly tops and it takes a big tree to support an eagle nest. Nesting sites are used for many years with more material being added each time the nest is used. Some nests contain as much as 150 cubic feet of limbs, twigs, moss and grass. This material sometimes accumulates to a depth of five to seven feet and six to eight feet in diameter (70:--).

Nest building begins in early April. Two eggs are usually laid which hatch by late May or early June. Eaglets are generally full feathered and ready to fly by the end of July (70:--).

Eagles feed on fish, waterfowl, birds and small mammals. Their hooked beaks and curved talons are well adapted for capturing prey and tearing flesh (70:--).

Bald eagles may be seen at any point along the Denali Highway.

The Denali area is one of the finer game and wildlife regions in Alaska. Its several vegetative systems are inhabited by a vast array of wildlife species ranging from the tiny pika to the massive grizzly bear. The birds, waterfowl, and large and small game along the Denali are an asset to all who visit the area. They add variety, interest, excitement and pleasure to the drive along the highway. For this reason alone, wildlife is a valuable natural resource; however, it is also an important

sport and economic resource. Hunting and fishing is good in this area and several lodges and local residents offer guided hunting and fishing trips for their livelihood. Many natives and local residents depend upon game for a large part of their food supply.

With all the amenities associated with wildlife in the Denali area, perhaps the most important is just knowing that areas accessible to the public still exist where a diverse population of wildlife species can be found.

While the Denali region is still a good wildlife area, it is important to note that wildlife numbers, especially moose and caribou, have been drastically reduced in recent years. This is largely due to the activities of man; overhunting and habitat disturbance and destruction. If man's activities in the area continue to grow, then the Denali area will probably be lost as a fine wildlife area.



Table 4. Denali Area Vegetative Systems and Associated Wildlife

1. <u>Alpine Tundra and Barren Ground</u>			
<u>Mammals</u>		<u>Birds</u>	
Dall sheep	Wolverine	Ptarmigan	Gyr Falcon
Mountain goat	Caribou	Raven	Songbirds
Hoary marmot	Elk	Golden eagle	Shorebirds
Pika	Coyote	Marsh hawk	Open country owls
Black bear	Red fox		
Brown-grizzly bear	Lemmings		
Wolf	Ground squirrel		
2. <u>Moist Tundra</u>			
<u>Mammals</u>		<u>Birds</u>	
Brown-grizzly bear	Wolverine	Ptarmigan	Swans
Moose	Caribou	Raven	Grebes
Wolf	Red fox	Bald eagle	Loons
		Jaegers	Sandhill crane
		Dabbling ducks	Songbirds
		Diving ducks	Hawks
		Geese	Shorebird
		Open country owls	
3. <u>High Brush</u>			
<u>Mammals</u>		<u>Birds</u>	
Black bear	Wolf	Ptarmigan	Owls
Brown-grizzly bear	Wolverine	Raven	Songbirds
Moose	Snowshoe hare	Hawks	
Caribou	Coyote		
Dall sheet	Red fox		
Mountain goat	Lynx		
4. <u>Low Brush Bog and Muskeg</u>			
<u>Mammals</u>		<u>Birds</u>	
Black bear	Beaver	Dabbling ducks	Sandhill crane
Brown-grizzly bear	Coyote	Diving ducks	Marsh hawk
Wolf	Red fox	Geese	Gyr Falcon
Wolverine	Mink	Swans	Shorebirds
Caribou	Weasel	Grebes	Open country owls
Moose	Muskrat	Loons	
	Land otter		
5. <u>Bottomland Spruce-Poplar Forest</u>			
<u>Mammals</u>		<u>Birds</u>	
Black bear	Lynx	Spruce grouse	Hawks
Brown-grizzly bear	Mink	Raven	Songbirds
Wolverine	Weasel	Bald eagle	Woodland owls
Moose	Marten	Osprey	
Beaver	Land otter		
Coyote	Red squirrel		
Red fox	Mice		

Adapted from: Alaska Regional Profiles, Southcentral Alaska, p. 150.

Fish

An appealing feature of the Denali area is the great numbers of lakes, ponds and streams that exist throughout the length of the highway. This may be deceiving to the enthusiastic fisherman since many of these water bodies are very shallow and contain no fish. The major rivers of the area, the Maclaren, Susitna and Nenana contain no fish during the summer months, due to the heavy silt load from the glaciers that form their headwaters. Certain fish, like the grayling, will winter in these rivers when the water clears of silt.

Most of the better fishing lakes in the Denali area are accessible only by foot, tracked vehicles or air. The Tangle Lakes are an exception and are easily accessible from the road. They offer good fishing for lake trout and grayling. Other easily accessible lakes in the Denali area are Summit Lake, Landmark Gap Lake and Glacier Lake.

A majority of Denali area streams support populations of grayling. These fish are migratory and may not always be present in a stream during a certain part of the summer, or they may move to different segments of the stream at different times of the summer. A fisherman who is not familiar with what area lakes contain fish, or the habits of fish like the grayling, may conclude that the Denali area is a poor fishery. Such is not the case, however.

The Denali area is a good to excellent fishery, particularly for grayling and lake trout. Trophy-sized grayling of 20 inches and above can be taken from many streams, while 30 pound plus lake trout are not uncommon in many of the larger deep lakes.

Grayling and lake trout are the most abundant sport fish in the Denali area, but burbot, whitefish, Northern pike, rainbow trout and dolly varden can also be caught.

Salmon can be found in the Denali area only in the Gulkana River near Paxson. The upper reaches of the Gulkana around Summit Lake, and the smaller tributary streams form the spawning grounds of sockeye salmon. Sockeye usually reach this area in late June to early July. No salmon fishing is allowed above Paxson lake during these spawning runs. Salmon do not migrate up the Susitna, Maclaren, or Nenana Rivers as far as the Denali Highway because of difficult rapids and other natural blockages in these streams.

The three most popular sport fish in the Denali area; grayling, lake trout, and burbot are featured in the following discussion. (Refer to Fishing Location Map on page 28.)

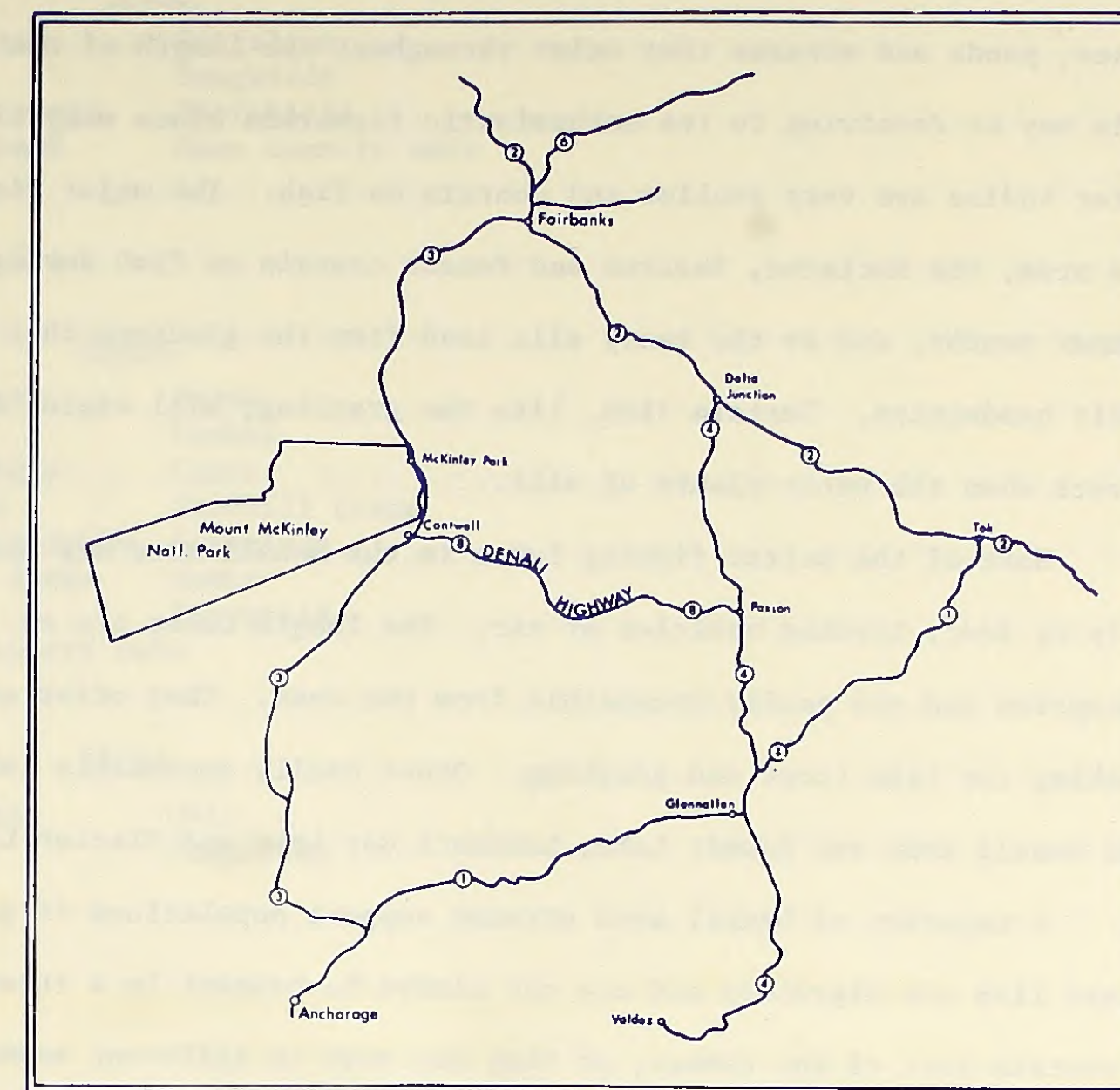
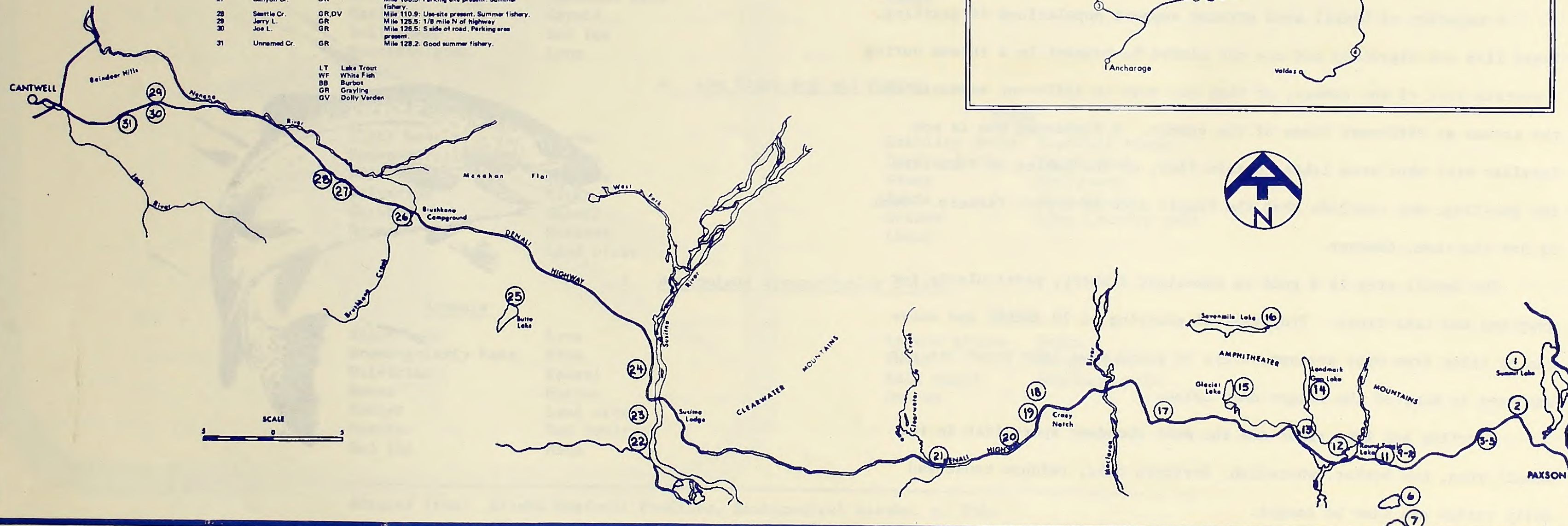


DENALI HIGHWAY

FISHING LOCATIONS

Site No.	Water	Fish Present	Location-Accessibility
1	Summit L.	LT,WF	Richardson Highway 6 miles N. from Paxson
2	Seven-Mile L.	LT	Mile 7: Take gravel road 3/4 mile to lake.
3	Ten-Mile L.	LT,GR,WF,BB	Excellent summer fishing.
4	Tandrop L.	LT,GR,BB	Mile 10: Pull-off small. Short hike downhill to outlet. Summer fishery.
5	Octopus L.	LT,GR,WF	Mile 10.4: Short hike down steep hill to the S. Good summer fishery.
6	Little Swade L.	LT	Mile 11: 1/4 mile S of road.
7	Big Swade L.	LT,GR,WF,BB	Mile 16.8: 2 1/4 S of highway by cat trail. Excellent fishing.
8	16.8-Mile L.	LT,GR	Mile 16.8: 2 miles S of Little Swade Lake. Excellent fishing.
9	Rusty L.	LT,GR	Mile 16.8: Walk N up creek 200 yards to lake.
10	17-Mile L.	LT,GR	Mile 16.8: Behind 16.8-Mile Lake. Walk 1/4 mile NW of 16.8-Mile Lake.
11	Clearwater Cr.	GR	Mile 17: Small lake with fair to good summer fishing.
12	Tangle Lakes	LT,GR,WF,BB	Mile 18.1: Road crosses creek. Parking area present. Spring and summer fishery.
13	Rock Cr.	GR	Mile 22.5: Road crosses Tangle River. Use-site present. Accommodations available.
14	Landmark Gap L.	LT,GR,WF	Mile 25.3: Parking area present. Fair summer fishery.
15	Glacier L.	LT,GR,WF	Mile 28.3 miles due N from highway on cat trail. Good lake trout.
16	Boulder (7-Mile) L.	LT,GR,WF	Mile 31: Parking area present on N side of highway. Follow cat trail 2 miles N to lake. Excellent summer fishing.
17	36-Mile L.	LT,GR,WF	Mile 31: Proceed 4 miles due N of Glacier Lake, or air charter from Summit Lake. Cabin and boats present.
18	46.9-Mile L.	GR	Mile 36: Walk 1/4 mile N of road.
19	Crooked Cr.	GR	Mile 46.9: N side of road. Lake and outlet excellent for large grayling.
20	50-Mile L.	GR,WF	Mile 46.9-50: Creek parallels highway. Excellent fishing.
21	Clearwater Cr.	GR	Mile 50: N side of road. Fair fishing.
22	Butte Cr.	GR,WF	Mile 58: Highway crosses creek. Use-site present. Summer fishing.
23	Sand L.	LT	Mile 79.7: Susitna River bridge crossing. Parking area S side of highway. Follow Susitna River downstream 6 1/2 miles to creek junction.
24	Stevenson's L.	GR	Mile 79.9: Susitna River bridge crossing. Follow Sand Lake trail 2 miles S.
25	Butte L.	WF,LT,GR	Mile 84: 1/4 mile S of road.
26	Brushkane Cr.	GR,GV	Mile 93.8: Take Butte L. Trail, S of highway, 3 miles.
27	Canyon Cr.	GR	Mile 105.5: Use-site present. Summer fishery.
28	Settle Cr.	GR,DV	Mile 106.5: Parking site present. Summer fishery.
29	Jerry L.	GR	Mile 110.9: Use-site present. Summer fishery.
30	Joe L.	GR	Mile 125.5: 1/8 mile N of highway.
31	Unnamed Cr.	GR	Mile 126.5: Side of road. Parking area present.
			Mile 128.2: Good summer fishery.

LT Lake Trout
WF White Fish
BB Burbot
GR Grayling
GV Dolly Varden



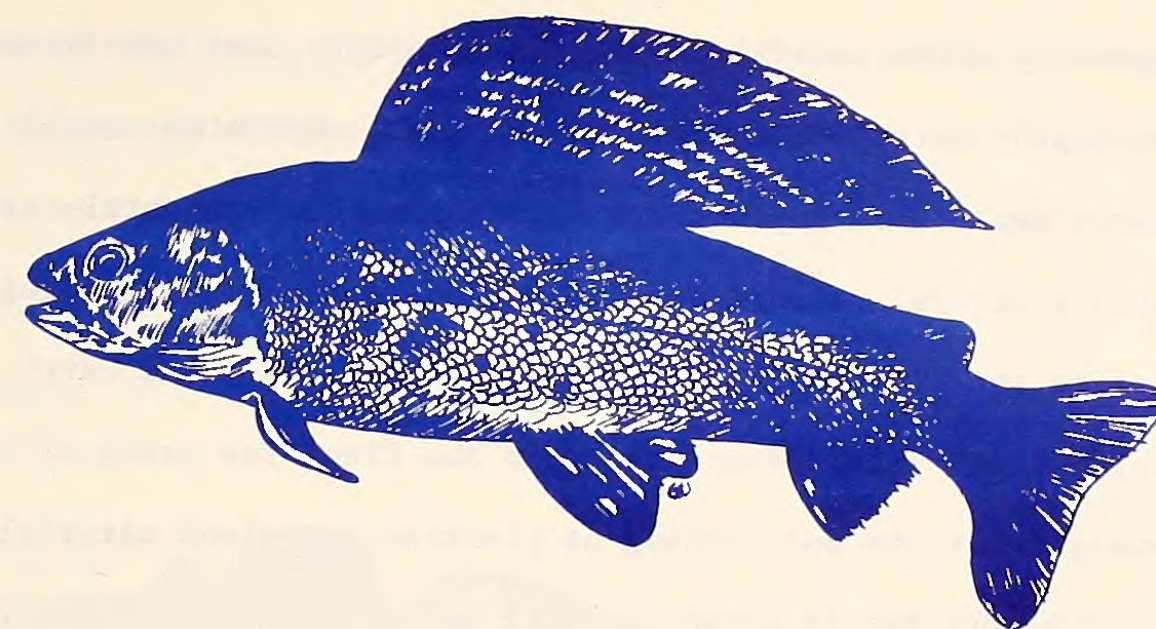
Grayling. Perhaps one of the most interesting of Alaskan fish to fisherman is the Arctic grayling (Thymallus arcticus). The grayling is a game fish so restricted in its range in states outside of Alaska that relatively few fishermen are acquainted with it. Michigan and Montana had small populations of grayling, but they became extinct in those states in the 1930's. Some have now been reintroduced in Montana, Wyoming and Colorado (44:--). Since grayling prefer clear, cold streams and lakes and are extremely susceptible to pollution or disturbance of their environment, the waters of the Denali area are a perfect habitat.

The grayling is a dark purplish color on its back, with irridescent green-gray sides and a bluish-white abdomen. The crowning glory and most noticeable characteristic of the grayling is an immense dorsal fin dotted with large, brilliant red or bluish-purple spots surrounded by a shade of emerald green (44:--). Grayling are found in rivers and streams throughout most of Alaska. In smaller rivers and streams the grayling migrate to lakes to spend the winter, but in the Susitna River drainage grayling winter in the Susitna after the water has cleared of its glacial silt load.

The growth of Alaskan grayling, especially in streams, is slow. A twelve inch fish is probably six to seven years old, while a nineteen inch fish is about nine years old. Grayling average twelve to sixteen inches in the Denali area, with trophy twenty inch fish not uncommon (44:--).

The grayling is an avid top water feeder and its reputation for taking dry or wet flies is completely justified. For this reason the grayling is a favorite among stream fishermen and has attracted a loyal

following of "fly only" purist anglers. The strike of a grayling taking a dry fly is not unusually savage. On rising to a dry fly, grayling will arch gracefully out of the water and take the fly on the downward plunge. While not an unusually dogged fighter, a hooked grayling leaps out of the water repeatedly and gives a worthy account of itself right up to the landing net. Grayling are excellent table fare and a favorite among Alaskans (44:--).



Lake trout. Another popular game fish of the Denali area is the lake trout (Salvelinus namaycush), Alaska's largest freshwater fish. Lake trout are also the largest of the group of fishes known as Char. In Alaska, close relatives of the lake trout are dolly varden and Arctic char (61:--).

Lake trout have a body shape similar to that of trout and salmon. Generally, they have small, light irregularly shaped spots on a silvery-to-dark grey background, but color varies at different seasons and in different lakes. The male and female are quite similar in appearance, with males having a slightly longer, more pointed snout. A feature that easily distinguishes lake trout from other char is their deeply forked tail (61:--).

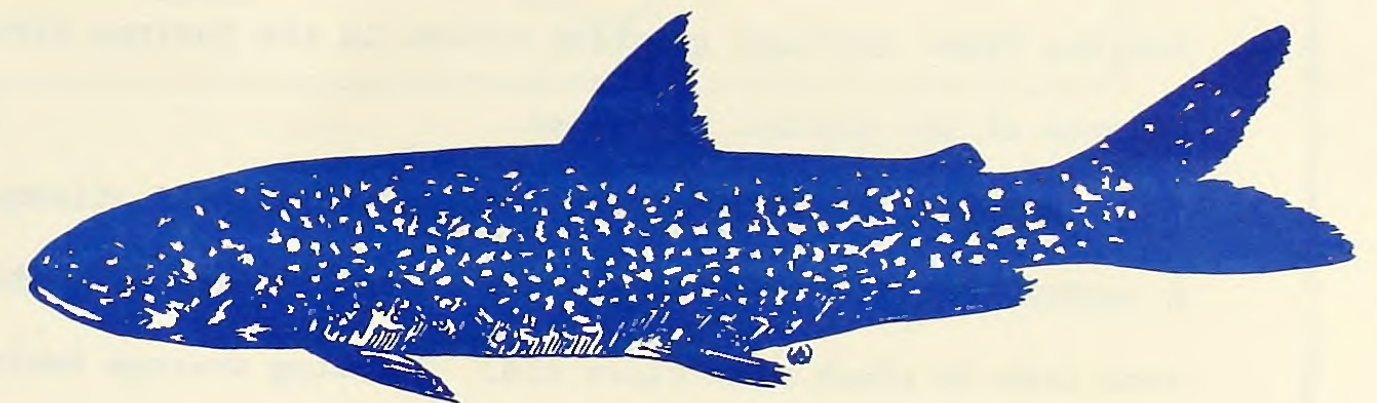
Lake trout spend their entire lives in lakes, and large, deep, and cold lakes are preferred. "Lakers" spawn in early fall in broken rock or gravelly areas, usually along the lakeshore, but have been found spawning at depths between 6 inches and 200 feet. Spawning usually begins when the water has cooled to about 50 degrees, with no parental care given other than a careful selection of spawning sites. Fertilized eggs settle into cracks and crevices between the rocks or gravel and hatch early the following spring. Lake trout fry spend the first few years of their lives hiding among the rocks and feeding on plankton and plant material. The small fish grow slowly and in seven or eight years, when they spawn for the first time, they are still only about 18 inches in length (61:--).

Food concentration is often low in the large lakes where lake trout are found and their diet is then determined by what they can find rather than what they prefer. In general, small lake trout feed chiefly upon insects and some small fish. The lakes with a small or nonexistent species of forage fish, such as whitefish produce lake trout that tend to be small and stunted. In Alaska, such situations usually result in large numbers of

lake trout with individual fish seldom larger than 16 inches. Seven-mile Lake, just north of the Denali Highway, between the Maclaren River and the Tangle Lakes, is an excellent example of this stunted fish situation. Denali area lake trout also feed on mice and voles that fall into the lake. As many as four voles have been found in the stomach of one lake trout (61:--).

In Alaskan waters, lake trout weighing up to 54 pounds have been taken by rod and reel, but generally lakers weigh in at 15-25 pounds (61:--).

Some of the more accessible lake trout fishing lakes near the Denali Highway are Summit, Paxson, the Tangle Lakes, Landmark Gap Lake and Glacier Lake.



Burbot. The burbot (Lota lota) is one of the most unusual looking freshwater fish native to Alaska. Its somewhat eel-like appearance makes it unattractive to many, however, behind its homely facade the burbot is a valuable food and recreational fish and is excellent eating. Burbot bite readily on bait, especially fish heads or tails, and are becoming a popular fish to south-central Alaska ice-fishing enthusiasts (63:--).

Two features distinguish the burbot from other freshwater fish of Alaska. On the underside of the lower jaw, near the tip is a single, prominent barbel or "chin whisker," which may at first glance give a catfish appearance to the fish. Two dorsal fins occur along the burbot's back, running from the middle of the body almost to the tail which is rounded rather than square or forked. A ventral fin also runs from the middle of the burbot's underside to its rounded tail fin. The eel-like body of the burbot is olive-black interspersed with yellow mottles. Its shiny body appears to be scaleless, but actually has small, almost microscopic scales. The burbot is also known as a ling cod, freshwater cusk and eelpout (63:--).

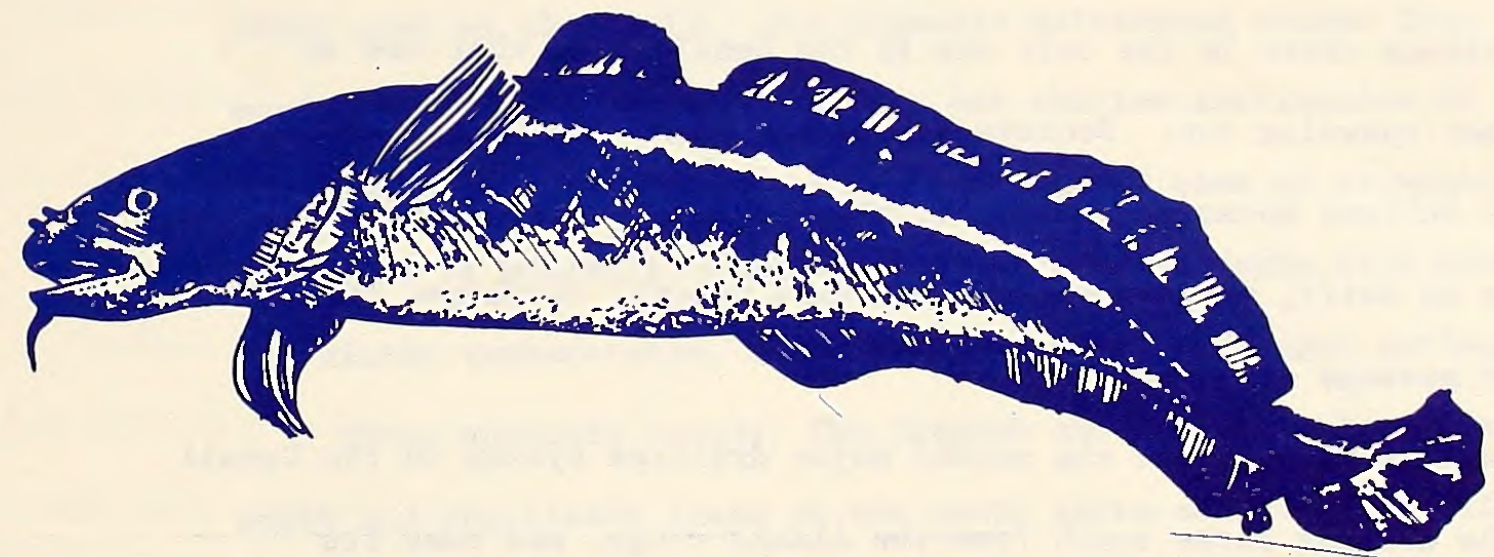
The burbot is found throughout interior Alaska, but is absent in the Alaska Peninsula, the south-central coastal area and the eastern panhandle. The burbot is also found in Canada, the Great Lakes Basin, the northern Rocky Mountain states, Siberia and northern Europe (63:--).

In Alaska, burbot are common in many streams and in lakes of all sizes; generally, they prefer cool, deep lakes. Along the Denali Highway, burbot are found in Ten-mile Lake, Teardrop Lake, Big Swede Lake, and the Tangle Lakes. They also occur in Paxson and Summit Lakes near Paxson.

Burbot first spawn between the ages of four to seven when they reach a length of 12 to 18 inches. Spawning occurs during February-April in lakes or rivers under ice cover. Fry and fingerling burbot feed on plant material and small invertebrates, while the adult diet consists almost entirely of fish. Like the lake trout, the burbot's diet is dictated by what is most available (63:--). Whitefish is a primary food source because of its abundance in burbot inhabited waters in the Denali area.

Burbot are slow growers and a twenty inch fish may be eight years old. Sixteen year old burbot are not uncommon. Burbot grow quite large and may reach record proportions such as the 17 pound 42 inch giant caught near Glenallen, Alaska in 1970 (63:--).

Fishing in the Denali area is an important recreation activity and will probably increase in importance in the future. Fishing is excellent in the waters of the area, but since many of the lakes and ponds contain no fish, those lakes and streams that do will receive heavy fishing pressure in the future and should be managed wisely to preserve the fish populations and maintain an excellent recreation resource.



Water

The Denali area water resource is vast. Hundreds of large and small lakes, ponds, creeks, streams and several major rivers form a major resource of the Denali area. Most of these water bodies owe their existence to glacial ice either past or present. In particular, the major rivers of the Gulkana, Maclaren, Susitna and Nenana all take their names from the glaciers from which they originate. Large area lakes such as Summit, Tangle, Landmark Gap, Glacier and Seven-mile owe at least part of their existence to glacial waters. Innumerable small kettle and rock basin lakes were glacially formed and hundreds of small creeks and streams flow from glacial-melt water.

There are three major drainage systems in the Denali area; the Gulkana, Susitna and Nenana Rivers. The Gulkana River, at the east end of the highway, flows south from Summit Lake to form the primary source of supply for Paxson Lake, southwest of Paxson. After leaving the south end of Paxson Lake the river is joined by the Middle Fork River which drains Swede Lake and numerous small streams. The river runs south to the town of Gulkana where it joins the Copper River to eventually flow into Prince William Sound.

The Gulkana river is the only one in the Denali area that has an annual salmon spawning run. Sockeye salmon can reach the Denali area through the Gulkana because, unlike the other major rivers of the area, the Gulkana has no swift, narrow currents or other natural blockages that prevent the passage of salmon.

The Susitna River forms the second major drainage system in the Denali region. The Susitna flows south from the Alaska range, and owes its existence largely to the Susitna Glacier, which is visible from the highway.

The river is joined by both the East and West Fork Susitna Rivers before it reaches the highway. The East and West Forks also originate from glaciers that flow south from the Alaska Range. South of the Denali Highway the Susitna is joined by Butte Creek and numerous smaller streams, and eventually collects the flow of the Maclaren River. The Maclaren has a large drainage area of its own, and originates at the base of the Maclaren Glacier which flows south from the Alaska Range. The Susitna eventually turns west to flow through the Talkeeta Mountains and then south to empty into Cook Inlet.

The third major drainage of the Denali area is the Nenana River which passes close to the highway near its western end. The primary source of the Nenana River is the Nenana Glacier, another product of the Alaska Range. The Nenana comes in close proximity to the Denali Highway at milepost 107 where it collects the combined flows of Brushkana collecting the flow of many small streams, and then turns north near Cantwell to flow out of the area. The Nenana flows into the Tanana River, which flows into the Yukon and out to the Bering Sea.

The Athabascan Indians of the Denali area have historically made wide use of their water resources for transportation and food. Bark canoes were used in summer to float rivers and streams and set traps for whitefish. Waterways were also a convenient transport route during winter travel because they provided relatively flat, smooth surfaces for sleds.

Water is still an important component of the Denali area transportation system today. There are four forms of transportation in the Denali area in addition to airplanes, which are limited due to lack of landing spaces. These are air or paddle boats, tracked vehicles, roadways and hiking. Waterways are an enjoyable alternative to hiking and provide easy accessibility to backcountry areas where roadways

are non-existent and tracked vehicles may be difficult or impossible to use. Denali waterways also provide many miles of shoreline and surface acreage for fishing and canoeing. The larger rivers and some of the large lakes in the area cannot be used by conventional water-cooled marine engines because of the heavy silt load, but power boating is possible and popular on the Tangle Lakes. Air-powered boats are now in use on many area waterways where water-cooled engines cannot go.

No major hydroelectric power sites now exist on any of the rivers in the Denali area. Several sites along both the Nenana and Susitna Rivers have been identified as potential hydroelectric sites by the Federal Field Committee for Development Planning in Alaska in their report Alaska Natives and the Land. Two such sites are located in the Denali area, one each on the Nenana and Susitna Rivers. The proposed Susitna site is several miles downstream from the Denali Highway and is generally unpopular with area residents. The Nenana River site is located near Brushkana Creek.

The waters of the Denali area are an important resource in many ways. It provides visual beauty and variety to the highway corridor, habitat for fish, waterfowl, and mammals, and outstanding recreation and transportation resources.

This area could not provide the variety of recreation and wildlife that it does without the water resource.

Weather and Climate

The climate of a region is an absolute determinate of how people will use the out-of-doors in both work and play. One must understand the climate and the local weather conditions before concepts of recreation planning may be consummated.

Weather and climate information reveals the average number of blue-sky days available for outdoor activities; how to orient facilities to take advantage of the sun's rays or to minimize the effects of chilling breezes; where to plant trees to break the wind, to collect snow or to provide shade; or when water may be turned on in the springtime without risk of freezing. These and countless additional uses are possible from an accurate accumulation of weather and climate data. Two major factors influence the weather in the Denali Highway area. These are latitude and breezes from the south and southwest that deliver warm moist air to the area during spring and early summer.

Day length and inclination of the sun are determined by latitude. Days become longer or shorter, depending upon the season, at the rate of 1 hour for each 11 days. There are 20 hours and 24 minutes of daylight hours on June 21, the longest day and 3 hours and 36 minutes on December 21, the shortest day. The inclination of the sun is 50 1/2 degrees on June 21 and 3 1/2 degrees on December 21. The equinoxes, March 21 and September 21 have 12 hours of daylight and the inclination of the sun is 27 degrees.

Overall, this region receives an amount of sunshine equal to any other part of the world. The climatic difference arises from the great variations in day length by season and the low inclination of the sun.

The Denali area is under the continental zone of climatic influence. This zone is generally characterized as a dry climate with extreme summer and winter temperatures, light precipitation, and light surface winds.

Three mountain ranges, The Chugach and Talkeetna Mountains to the south and the Alaska Range to the north serve as weather barriers for the

Denali area. Mountains to the south impede and precipitate warm moist air from the Gulf of Alaska and mountains to the north block the flow of colder continental air from deeper interior regions.

Extreme temperature variations are characteristic of the area with a range between the annual maximum and minimum temperatures of over 150°F. During the winter months the average minimum temperature falls between 0 and -8° with -30 to -40° recordings common (65). Summer mean maximum temperatures frequently rise above 70° and daytime temperatures may reach 90° locally (66).

Precipitation along the Denali Highway is considered light, averaging between 12 and 20 inches annually with about one-half of this occurring in the summer months (71). Much of the summer moisture comes in the form of light mist. Snowfall averages about 20 inches annually along the highway with local variations to 80 inches or more in the Alaska Range to the north (66).

Wind direction is variable with speeds of 3 to 10 miles per hour, but extremes of 40 to 80 miles per hour may be encountered in the mountain passes and narrow valleys.

Local records kept at Paxson from 1969 to 1973 give the following results: mean maximum temperature 33.9°F, mean minimum temperature 10.7°F, record high 85°F, and record low -59°F. Mean annual rainfall was 17.4 inches and mean annual snowfall was 109.5 inches.

Weather data has not been accurately recorded along the highway, therefore specific weather and climate information is not available for this study. Records have been kept at Mt. McKinley National Park since 1925, and this information may apply generally to the Denali Highway area. It is the best source of information available and graphics prepared from these records are in Appendix C.

Middle to late summer and early fall provide the best season for recreation along the highway. Late spring and early summer offer much overcast sky with light mist and cool temperatures while late summer and early fall have much drier weather with more sunshine days and warmer temperatures. Late fall brings more overcast, snow, and colder temperatures.

Overall, the recreation season is about 90-100 days in length along the Denali Highway and many of these days are overcast and cool.

Historical and Cultural Inventory

Anthropologists believe that between twelve and twenty-five thousand years ago Mongolian tribes crossed over from Asia to America by way of the Bering Straits. The shallowness of the Bering Sea, a mere one hundred and twenty feet in that area, strengthens the belief that at one time an isthmus connected the two continents. Adding support to the isthmus theory is the discovery each year of skeletal remains of prehistoric bison, mammoths, and mastodons in both Asia and Alaska. No human skeletal remains contemporary with these extinct Pleistocene animals have been discovered, but the presence of ancient village sites in various parts of the state and along the Denali Highway suggest that man has been in Alaska for thousands of years (14:20).

Numerous archeological sites are present in the Denali Highway area from the Maclaren River east to Paxson. The most significant archeological concentration known is in the Tangle, Dickey, Summit, Paxson and Fielding Lakes area. These sites contain materials that may be among the oldest known in Alaska. Many of the artifacts found are of a type previously unknown and undescribed (78). Since most of these sites are situated on hilltops and ridges, and consist primarily of spear and arrow points, it is believed that these high locations served as observation points from which the natives could watch and wait for game. To date, there has been little exploration to locate additional archeological sites and it is suspected there are many more to be found. Archeologists suspect that the valleys and river basins of the Denali area contain ancient village sites, because such sites afforded maximum protection from the elements.

The Nelchina Caribou herd formerly roamed the Denali area in much greater numbers. This herd provided a dependable source of food for



ancient man and is probably the primary reason for such a concentration of archeological sites in this area.

The Denali Highway area is the historic territory of the Tanaina and Ahtna tribes of Athabascan Indians who today still inhabit the area. These interior Indians were primarily caribou and moose hunters, but supplemented their diets with rabbits, birds, eggs, fish, berries, and roots. Caribou were herded through openings in long, brush, fence enclosures where they were snared and speared. Moose were caught in snares and killed in winter when the snow was too deep for them to move rapidly. Weapons consisted of bow and arrow, spear and clubs. Arrow tips were made of flint while knives were fashioned from stone and native copper. Bark canoes, similar to those of the Central Plains Indians were made for river travel, while snowshoes and sleds were used in winter. Skin parkas and pants were the principle item of dress. Moccasins were worn in cold weather. Lodging was crude consisting of a framework of poles covered with bark, caribou hide and brush, heated with fire and insulated by the winter snow. Summer habitations were the same style but of flimsy construction.

The social structure of the Athabascans was simple. A chief, elected by common consent headed each group, but had only as much authority as the tribe was willing to grant him. Community affairs were settled by a general council in which the chief and the older men ruled by custom. Religious beliefs, before the Russian Orthodox influence, was a kind of demonology with little or no conception of a supreme being. Work was shared by both men and women; men usually the hunters and the women clothing makers (14:28).

The Athabascan people came to the Denali Highway area from the Copper River region to the southeast and settled the town of Denali long before

the white man came to mine gold near the settlement. When Pete Monahan, struck gold in Denali in 1903, the native population of the hunting settlement was about 100 persons (95). Until that time the native livelihood came from fishing and hunting moose, caribou and sheep. After the discovery of gold, the native subsistence shifted from fishing and hunting to working in the mines for white owners for a dollar-an-hour wage. Many native homes were built directly over gold deposits that later became gold mines. A resident of one such home, former Athabascan chief Henry Peters, relates that the early owners of Denali's largest mining operation, the McKinley Gold and Placer Mining Company, employed two mining techniques; underground mining and placer mining a water washing process using steel pipe. The pipe was brought to Denali by dogsled up the ice covered Susitna River. This was the cheapest and most practical method of transport in the early days of mining. The McKinley Gold Company owned almost all of the claims around Denali in those days and it was a large and successful operation. A few other claims were worked as small operations, but were not successful. The Timberline quartz mine was operated by the Alaska Exploration Mining Company for the gold content of the quartz, but was never very successful (95).

John Carlson, the principle owner of the McKinley Gold Placer Mining Company, founded the town of Cantwell in about 1918. In the late 1930's gold production in the Denali began to taper off. Finding themselves out of work and unable now to make a living from fishing and hunting, the Athabascan population of Denali shifted to Cantwell and took jobs with the Alaska railraod, the Alaska Road Commission, and in Mt. McKinley National Park (95). Today, these are still the primary sources of employment for the Athabascan Indians, but some supplement their income by selling Indian handicrafts such as beaver and fox hats, moccasins, and caribou hide coats.

Hunting is no longer a source of livelihood for the Indians because of the limited game herds as compared to former times, and because of hunting competition by sport hunters.

Modern Athabascan Indians are still mostly of the Russian Orthodox faith, stemming from possession of Alaska from 1741 to 1867. Some of the Indians have recently given up Russian burial customs and adopted the American ways. Russian priests taught the Indians that a 7-10 day pre-burial mourning period was a necessary prerequisite to disposal of the dead. This was followed by another extended period of celebrations and mourning. Former Athabascan chief Henry Peters thinks the standard white procedure of burial in three days is best because "its over with and done much sooner" (95).

The Russian burial style was also adopted by the Indians. An old Indian graveyard is still in existence in Denali with Russian Orthodox crosses at the head of most burial sites and a wooden box put over each grave. Personal effects of the deceased, such as clothing, rifles, or utensils were put in these boxes, but this custom has been discontinued in many cases in recent years due to theft of the items (95). The Denali graveyard is very old and is in a state of disrepair.

Denali itself is just a small cluster of old homes. Most of the former buildings have long since either fallen down or been bulldozed over. The town can be reached by taking an old road which intersects the Denali Highway on the north side at mile 79 and runs north for about six miles. Two streams must be crossed along the route and are not passable by four wheel drive vehicles at certain times of the year. Denali does not attract many tourists because of its inaccessibility. Most vehicles

cannot negotiate the road leading to the town, with the only other feasible alternative being an air taxi flight from the Susitna Lodge or Gracious House.

Today Denali is almost a ghost town compared to its former days of glory. Three mining claims are presently being worked, with one a fairly large placer operation. Population varies seasonally up to a maximum of 12-18 people with only one permanent resident, a long time prospector and gold miner named Leroy B. "Shorty" Kercher. "Shorty" is a crusty old sourdough with a gift for gab and a flair for storytelling. He is knowledgeable in mining techniques, especially gold panning. He knows the history of Denali, and is himself a valuable resource of the area.

Although only a collection of old broken buildings, the town still has character and a certain "presence" about it. One can almost hear the picks and shovels as they work the ground for its precious load.

Today the population center of the Denali area has shifted to Cantwell at the western end of the highway. A smaller population exists in Paxson at the east end of the highway with several lodges, inns and camps in-between to serve the seasonal tourist, hunting and fishing trade. Most of these highway establishments close in the winter months and their inhabitants leave the area. Only a few of the heartiest remain on the highway throughout the winter.

Visitor Services Inventory

Visitor services are an important component of safety, comfort and enjoyment in an area as remote as the Denali Highway. People want to know where they can get a tire repaired, purchase gasoline or buy food items. The several lodges and retail establishments along the Denali catering to the tourist and hunting trade have advertised in several publications such as the Milepost and also have erected their own signs along the highway so that a traveler can find where to obtain goods. Individual advertising lacks standardized, uniform and aesthetically pleasing results, especially in road signing.

The services and other commodities available to the Denali traveler have generally been adequate to meet the present demand. Gasoline, food, lodging, camping, repairs and guide services are all available at several well-spaced intervals along the roadway. Professional medical attention, emergency phone service, propane and sanitary trailer dumps are available only at Paxson, Cantwell or larger cities such as Fairbanks and Anchorage.

The following list of visitor services includes: lodges, inns, and camps, where they are located, and what services they offer, emergency and miscellaneous services, and where they can be found.

Emergency services

Medical - No officially designated first aid stations, but most of the lodges and inns along the highway have first aid supplies.

Hospitals - Nearest are located in Glenallen or Anchorage.

Doctors - Nearest is in Glenallen.

Police - Alaska State Troopers in Cantwell or Paxson.

Fire - Glenallen.

Telephone - Cantwell or Paxson.

Lodges

Paxson Lodge - located at the junction of the Richardson and Denali Highways. The lodge offers rooms with baths, gasoline, a restaurant, gifts and liquor. The lodge is open 24 hours a day the year around.

Mile 20: Tangle River Inn - food, gas and lodging. Hosts: Jack and Nadine Johnson.

Mile 22: Tangle Lake Sportsman Camp - bar, restaurant, cabins, showers, groceries, gasoline, laundry, river boat charter service and guided hunts. Open June-September. Host: Jay Gesin.

Mile 42: Maclaren River Lodge - food, lodging and river boats.

Mile 51: Moore's Camp - campsites, groceries and guided hunting. Planned: dump station, showers and gasoline. Host: Jim Moore.

Mile 44.2: Susitna Lodge - rooms, cafe, gasoline, guided hunting and fishing trips, air taxi, towing service, auto and tire repair, limited fishing tackle and ammunition and high frequency radio to Anchorage.

Mile 82: Gracious House - cabins, cafe, gasoline, air taxi, hunting and fishing guide service, saddle horses, river boat trips and auto repair and tow service. Hosts: The Gracious Brothers.

Mile 100: Adventures Unlimited - cafe, lodging, guided hunting, fishing and photo trips and ATV's available. Host: Jim Grimes.

Cantwell - general store, restaurant, bar, gas station, showers, laundromat.

Other Services

Citizens Band Radio - Gracious House and Susitna Lodge.

Dump station - None along the highway, nearest located in Cantwell.

Propane - None available along the highway, nearest is in Cantwell.

Unleaded gas - None along the highway.

Table 5. Denali Highway Services

	MILE POST	Gasoline	Propane	Repairs	Towing	Campsites	Picnic sites	Lodging	Bath	Restaurant	Bar	Liquor	Groceries	Gifts	Laundry	Telephone or radio	Hunting and fishing guide services	Boats	All terrain vehicles	Aircraft	Horses	Fishing tackle and hunting equipment	Boat launch sites
Paxson Lodge	0.0	x						x	x	x	x	x		x			x	x					
Tangle River Inn	20.0	x				x		x		x	x		x										
Tangle Lakes Campground U.S. Bureau of Land Management	21.7					x	x																x
Tangle Lake Sportsman Camp	22.0	x						x	x	x	x				x		x	x					
Maclaren River Lodge	42.0	x						x		x			x				x	x					
Moore's Camp	51.0					x	x										x						
Susitna Lodge	77.2	x				x		x	x	x						x	x	x		x		x	
Gratious House	82.0	x		x	x			x		x						x	x	x	x	x	x		
Adventures Unlimited	100.0							x		x							x		x				
Brushkana Campground U.S. Bureau of Land Management	104.5					x	x																
Cantwell		x	x	x	x			x	x	x	x	x	x	x	x	x	x			x		x	

Recreation Inventory

Trails

The Denali highway area provides excellent opportunities in backcountry travel on its trails and side roads. There are twenty-two trails of various types and lengths for use by off-road-vehicles, packhorses and hikers. There are also two canoe trails; one, easy lake canoeing, the other dangerous rapids canoeing. Each of these trails are located in a natural, wild environment and contain many inherent dangers of which a backcountry visitor should be aware. The following will provide information such as distance, elevations, types of travel, hazards and trail difficulty on the trails found along the Denali Highway. All of the trails discussed in this section begin at a point on the Denali highway and are identified by reference to the highway mileposts. Trail Maps are located in Appendix A of this report.

Swede Lake Trail. The Swede Lake Trail is found on the south side of the Denali highway at milepost 17. This trail is an unimproved access road to the Swede Lake area. The trail is of medium difficulty for hikers and horsepackers and of extreme difficulty for four wheel drive vehicles except under dry weather conditions. Adequate vehicle parking is available at the trailhead in a large gravel pit just off the highway.

The Swede Lake Trail has no historic significance but is a favorite of recreationists for fishing and hunting. The trail is approximately three miles long and is made up of three separate tracks for most of that distance. There are no signs of litter along the trail.

The trail has received heavy damage by all terrain vehicles use and some type of ATV control is needed to protect the area from further damage. The trail is very rough and has eroded into small gullies in some places.

The trail starts at an elevation of 3050 feet, dropping to 2800 feet at Swede Lake and to 2500 feet at the Middle Fork of the Gulkana River. The terrain is rolling with a few small hills.

Wildlife that may be seen include bear, wolf, moose and caribou along with a variety of birds. Two bald eagles nesting in a tree halfway between Swede Lake and Little Swede Lake were spotted while on the inventory of the area. Grizzly bears in the area are considered the only real hazard to backcountry travelers.

There are no established camping facilities available along the trail but there is adequate space for those who want to camp. On the hill east of Swede Lake is Weston's Camp, operated by Dennis Weston and his family. This camp provides lodging, showers and boats for fishing.

One mile past the Swede Lake trailhead travelers can head west to find Little Swede Lake. This lake has no access by trails or roads and requires cross-country travel. Little Swede has good fishing for lake trout.

Near Swede Lake the trail branches; one branch heading southwest to Swede Lake, the other heads south six miles to the Middle Fork of the Gulkana River.

The Swede Lake trail is located in the areas covered by U.S.G.S. maps Mt. Hayes A-4 and Gulkana D-4, and is plotted on trail map number 2.

Trail from Tangle Lakes to the Falls on the Delta River. A trail from Tangle Lakes to the falls on the Delta River exists only in small stretches along the tops of the eskers that follow the shoreline of Tangle Lakes. Even though this trail has not been established as such, it receives use from canoeists who have the misfortune of wrapping their canoes around rocks in the dangerous rapids below the falls. This trail would provide the fastest route back to the highway for stranded canoeists

who may also lose camping gear with their canoe. The best route needs to be determined before the trail is established and bridges should be built across some of the deeper streams. The trail would be approximately ten miles in length.

This trail is located in the area covered by the U.S.G.S. map Mt Hayes A-4, and is plotted on trail map number 1 in this report, Appendix A.

Landmark Gap Trail. The Landmark Gap Trail begins and heads north at milepost 24.6, one hundred yards east of the Rock Creek bridge. The trail begins at 3100 feet elevation and crosses rolling terrain two miles to the Landmark Gap Lake at 3217 feet. Parking is available in a gravel pit at the trailhead.

This trail was established for access to Landmark Gap Lake by fishermen and hunters. The trail has not been maintained and has been used heavily at times by four wheel drive vehicles. It is rated easy for hikers and packhorses but of medium difficulty for 4WD vehicles. The trail is just wide enough for one vehicle through most of its distance, with four wider sections in marshy areas. One section has a detour of about 100 yards that is used during the spring when the main trail is closed by snow and a large pond.

The trail is very clean except for a fairly large trash pit at the shore of the lake. The initial contribution to the pit is believed to be from a recreation camper/trailer that burned at the lake. Removal of this trash is recommended from both an aesthetic and ecological standpoint.

The terrain is mostly flat to rolling with steep mountains on each side of Landmark Gap Lake. Wildlife that can be seen in the area are mostly birds but big game can be found in the area. Landmark Gap Lake

offers good fishing for lake trout and grayling. There are no established camping facilities at Landmark Gap but there is room for two or three campers.

This trail has potential for the first leg of a loop trail to Sevenmile Lake and back to the highway by way of Glacier Lake.

The Landmark Gap trail is located in the area covered by U.S.G.S. map Mt. Hayes A-5, and is plotted on trail map number 4, Appendix A.

Glacier Lake Trail. The Glacier Lake Trail begins and heads north at milepost 30.5. The trail begins at an elevation of 3750 feet and crosses a flat, marshy valley to Glacier Lake at an elevation of 3687 feet. There is a very small parking area for two or three vehicles.

This trail was established for access to Glacier Lake by fishermen and hunters. The trail is rated difficult for hikers and packhorses due to the two streams and the deep marsh that must be crossed. The trail is rated extremely difficult for vehicles for the same reasons. Glacier Lake trail is approximately two miles long and is primarily one track. Very little litter is present along the trail.

A small cabin is located at the end of the trail on the shoreline of Glacier Lake. The lake offers good fishing for lake trout.

This trail, along with the Landmark Gap Trail, provides one leg for the potential Sevenmile Lake Loop Trail.

It is located in the area covered by U.S.G.S. map Mt. Hayes A-5, and is plotted on trail map number 4, Appendix A.

Sevenmile Lake Loop Trail. Short stretches of existing game trails provide the potential for a loop trail from Landmark Gap Lake to Sevenmile Lake and Glacier Lake. This trail would be approximately nine miles long

and would need bridges over three of the larger streams. It could be extended to the Boulder Creek Trail that ends at the western end of Sevenmile Lake.

This trail is located in the area covered by U.S.G.S. map Mt. Hayes A-5, and is plotted on trail map number 4, Appendix A.

Boulder Creek Trail. The Boulder Creek Trail, at milepost 38.9, is an unimproved access road to Boulder Creek and Sevenmile Lake. There is no pullout available for parking. The main use of the trail is for fishing and hunting along Boulder Creek and at Sevenmile Lake. At present the trail is best suited for hikers and horsepackers, and is given a rating of difficult. The trail is rated extremely difficult for four wheel drive vehicles except under dry weather conditions. Boulder Creek is located approximately 2.5 miles down the trail and Sevenmile Lake is eight miles from the trailhead. Elevations range from 3150 to 3868.

The trail is one vehicle track wide through most of its distance. There is very little trash visible along the trail.

The trail traverses a gradual slope through its first two miles then follows Boulder Creek uphill to Sevenmile Lake. The vegetation consists of grasses, willows, dwarf birch and a few spruce trees near the beginning of the trail. Wildlife that may be seen include bear, moose, caribou and ptarmigan. The trail leads to popular ptarmigan hunting grounds. There is excellent fishing for grayling and lake trout at Sevenmile Lake and grayling in Boulder Creek.

No established camping facilities are available, but camping spots can be found along Boulder Creek and at Sevenmile Lake. There is a rowboat available at Sevenmile Lake for those wishing to use it.

Boulder Creek trail is located in the area covered by U.S.G.S. map Mt. Hayes A-5, and is plotted on trail map number 4, Appendix A.

Pioneer Access Road. The Pioneer Access Road, at milepost 43.5 is a trail of historical significance to the Denali highway. Vehicles can drive north from the Denali highway, 3.5 miles, on the Pioneer Access Road to the West Fork of the Maclaren River. At one time vehicles could drive the remaining 6.5 miles to the Kathleen Margaret Mine, but the bridge that once crossed the West Fork, has washed out limiting travel to hikers and packhorses. The trail was established for access to the Kathleen Margaret Copper Mine that produced over \$1 million worth of copper.

The trail is best suited for vehicle use to the West Fork of the Maclaren River and for hiking and packing from there. The vehicle portion of the trail is fairly easy going with the foot trail being medium difficulty. The West Fork and Cotton Creek must be crossed. One fork in the trail is confusing and should be marked. The trail has been washed out where the river has cut the riverbank away and a new stretch of trail needs to be established. Some sections of the trail are overgrown with ground cover.

It is clear of litter except for the old mining site. This trail shows little deterioration from recreation vehicle use. It was developed for the use of the mining vehicles and has held up well.

The trail begins at an elevation of 3000 feet and ends at an elevation of 4000 feet at the old mining site. The terrain near the trail is relatively flat along the Maclaren River with mountains on each side of the river. The trail is very rocky in some spots and muddy in others.

Vegetation consists of grasses, willows and dwarf birch. Wildlife that can be found in the area includes bear, wolf, fox, caribou and moose along with a wide variety of birds. Grayling can be caught at Hidden Lake.

Camping locations can be found along most creeks, Hidden Lake, and at the old mining site although none of these are established camping areas.

The main hazards for backcountry users are the bears and crossing the swift West Fork of the Maclaren river.

This trail is located in the area covered by U.S.G.S. maps A-6 and B-6, and is plotted on trail map number 1 in Appendix A.

Moore Camp Trail. The Moore Camp Trail begins at milepost 51.4 at Jim Moore's Private Campground. This trail was not inventoried so its length and final destination cannot be given. The trail supposedly heads south over a hill to the Maclaren River. Travelers must cross the property of Jim Moore who is developing a 20 unit campground in an old gravel pit. Moore permits passage over his property if people will keep their trash picked up.

This trail is located in the area covered by U.S.G.S. map Mt. Hayes A-6, and is not plotted on a trail map.

Denali Loop Trail. The Denali Loop trail begins at milepost 79.6 and heads north to the old mining town of Denali. The trail is 35 miles long and is passable by ATVs from the Denali highway for six miles to the town of Denali. It is passable only by hiking or packhorse from Denali and follows Valdez Creek over a pass, then follows Roosevelt Creek and passes near Roosevelt Lake. It then follows Pass Creek east and turns south to follow South Fork Creek for two miles, crosses another pass and turns back west to follow Windy Creek to the trails end near the Susitna Lodge. The trail is not always clearly visible but can be followed because it is above timberline. It ranges in elevation from 2500 feet to 4300 feet. Streams along the trail provide good grayling fishing. This

trail was not inventoried, but information was obtained from Denny Thompson at the Susitna Lodge.

The Denali Loop trail is located in the area covered by U.S.G.S. map Healy A-1, and is plotted on trail map number 5, Appendix A.

Butte Creek and Snodgrass Lake Trails. These trails were not inventoried by field investigation. Information was obtained from Denny Thompson at the Susitna Lodge.

The Snodgrass Lake trail is an ATV and hiking trail that begins at milepost 80 and runs two miles south to Snodgrass Lake (also known as Sand Lake). Just south of Snodgrass Lake the trail forks. The south fork is known as Reclamation Trail and provides access to a proposed dam site. The west fork is called the lower trail and is the lower fork of the Butte Creek trail. It joins Butte Creek trail often traveling in a westerly direction for approximately six miles, and totals about 16 miles to Butte Creek. It is fairly level and is suitable for vehicles, providing access to the Butte Creek area for hunters and fishermen.

The north fork of the Butte Creek trail begins at approximately mile 80.5, and is known as the Upper trail. This trail crosses rugged, steep terrain and is not recommended for vehicles. It extends six or seven miles before joining the Butte Creek trail and totals about 14 miles to Butte Creek.

These trails are located in the area covered by U.S.G.S. map Healy A-2, and are plotted on trail map number 6, Appendix A.

Butte Lake Trail. The Butte Lake trail begins at milepost 93.8 on the south side of the Denali highway at an elevation of 3000 feet. The main use of this trail is for fishing and hunting access to the Butte Lake area. The trail is best suited for hiking and packing and is

moderately difficult to traverse. It has been used by four wheel drive vehicles but due to deep bogs and marshes this trail is extremely difficult for any vehicle. The soil and vegetation show heavy damage from vehicle travel in the area, and the width of the trail often reaches four or five vehicle tracks in the wet, marshy areas.

The trail is characterized by muskeg and muddy, marsh areas. The terrain is relatively flat with a few low hills. The vegetation is primarily grasses, willows and dwarf birch. Crowberries, blueberries, bearberries, and cranberries are abundant. Butte Lake provides excellent grayling and lake trout fishing. Bear, wolf, fox, moose and caribou may be seen along the trail. The main camping location is at Butte Lake, however no formal area has been designated for camping.

Hazards to backcountry travelers are grizzly bears that roam the area and the possibility of getting vehicles stuck in muddy areas.

Jim Grimes rents a cabin and boat at the lake and for a fee will provide transportation from his lodge to the lake.

At present, adequate vehicle parking is available in a gravel pit at the trailhead south of the highway.

Butte Lake trail is located in the area covered by U.S.G.S. map Healy A-2, and is plotted on trail map number 7, Appendix A.

Jim Grimes Trails. Two trails, located 1/4 mile east and 1/4 mile west of the Adventures Unlimited Lodge at milepost 100 can be found on the south side of the highway. Both trails receive little use but do show some wear and erosion. The trails have been used by ATVs but are very steep and difficult to travel. These trails extend up hill to the top of a ridge overlooking Monahan Flats, and provide exceptional views of the Alaska Range on clear days. These trails cross excellent blueberry picking areas and provide hunting access in the fall.

Grimes' trails are located in the area covered by U.S.G.S. map Healy B-2, and are not plotted on trail maps in this report.

Brushkana Creek Trail. The Brushkana Creek Trail is a loop trail that begins and ends at Brushkana Creek Campground at milepost 104.5. The trail starts behind the first set of restrooms in the campground, and heads north one mile to an old bridge crossing Brushkana Creek. It then follows the creek upstream one mile to the campground. Parking and litter cans are available in the campground itself.

This trail provides an excellent opportunity for developing an interpretive trail for campground visitors. The area is excellent moose habitat and the history of the trail that used to cross Brushkana Creek over the old bridge would be of interest to many.

The terrain is characterized by rolling hills and valleys. The vegetation is primarily grasses, willows and dwarf birch with a thinly spaced stand of spruce trees. Big game found in the area include bear, moose and caribou. Brushkana Creek provides fishing for grayling. Berries found in the area include blueberries, cranberries and crowberries.

This trail is best suited for hikers, but the first half of the trail could be traveled by off-road-vehicles. The ATV portion of the trail provides access to a private cabin downstream from the old bridge. The trail from the bridge upstream to the campground is limited to hiking. The overall condition of the trail is very good. The hiking trail needs to be defined better in some locations by clearing vegetation and fallen timber. Camping facilities are available at Brushkana Creek Campground.

Brushkana Creek trail is located in the area covered by the U.S.G.S. map Healy B-3 and is plotted on trail map number 8, Appendix A.

Old Denali Road Trail. At milepost 108.5 the old route of the Denali highway can be found. It is now an eight mile stretch of ATV trail that intersects the highway at milepost 117.2. This trail was not inventoried by field investigation.

The old Denali road trail is located in the area covered by U.S.G.S. map Healy B-3, and is plotted on trail map number 8, Appendix A.

Seattle Creek Trail. The Seattle Creek Trail starts at milepost 110. From there the trail makes a semi-circular loop to the north and west back to the highway at mile 110.8 next to Seattle Creek. At the mid-point of the semi-circle loop a trail can be followed to the top of a hill. From here one can get an excellent view of the Nenana River Basin, and has a fair chance of seeing a moose. The trail is in good condition having a well drained gravel base.

Seattle Creek Trail is located in the area covered by U.S.G.S. map Healy B-3, and is plotted on trail map number 8, Appendix A.

Canoe Trails

Delta River Canoe Trail. The Delta River Canoe Trail offers a wide variety of waters from smooth lake canoeing to white water river canoeing. A wide range of scenic attractions is presented to the canoeist as he follows the chain of Tangle Lakes through the first part of the course. The Delta river forms this second part of the trail, and is not recommended for inexperienced canoeists.

The canoe trail begins at Tangle Lakes Campground at milepost 22. Paddling north through the chain of Tangle Lakes, the first real river canoeing is found two miles before the portage on the Delta river. The portage is 1/4 mile long and is located on the right bank. Extending two miles below the portage are difficult rapids, which are followed by

fairly calm waters. The Delta river is a clearwater stream to the point where it collects the flow of Eureka Creek, a glacial stream. Prior to this point there is excellent fishing for grayling in the river and lake trout, grayling, whitefish and burbot in Tangle Lakes.

The canoe trail ends at the Richardson Highway at milepost 212.5. Beyond this point the river is rated very difficult. The total trip is 35 miles.

Delta River Canoe Trail is located in the area covered by U.S.G.S. map Mt. Hayes A-4 and B-4, and is plotted on trail map number 1, Appendix A.

Upper Tangle Lakes to Dickey Lake Canoe Trail. The Upper Tangle Lakes Canoe Trail is unique because it offers strictly lake canoeing with portages. The trail is known for its excellent fishing for lake trout, grayling, whitefish and burbot. The canoe trail begins at Tangle River Boat Launch and Picnic Area at milepost 22 and heads south. After the first lake the canoe trail may be followed either of two ways. The first floats the Tangle River two miles to the third lake of the Tangle Lakes chain but only when the water is high. The other trail will portage 1/4 mile to Upper Tangle Lake, then across the lake where the trail requires another 1/4 mile portage to the third lake of the chain. The fourth lake is reached by following a small creek, then Dickey Lake is reached by making a one mile portage from the fourth lake. The portages are not marked so a canoeist must rely on maps. The total trip is nine miles long.

U.S.G.S. maps covering the canoe trail are Gulkana D-5 and Mt. Hayes A-5. The Upper Tangle Lakes canoe route is plotted on trail map number 3.

Campgrounds

Tangle Lakes Campground. Tangle Lakes Campground is located on the north side of the highway at milepost 22. Campers must drive from the highway 1/2 mile to the campground. The campground is located on the shore of Round Tangle Lake. It has thirteen camping units and four pit toilets. No waterwell is available.

A boat launch is available for boating on Round Tangle Lake and the lake chain downstream. The lake provides excellent fishing for lake trout, grayling, whitefish, and burbot.

The campground also provides access to the Delta River Canoe Trail.

On summer weekends the campground is almost always full beyond capacity, and on holiday weekends vehicles may number from 50 to 100 and more.

Tangle River Boat Launch and Picnic Area. The Tangle River Boat Launch is located on the south side of the highway at milepost 22 on the edge of Tangle River. The area was designed for picnickers and to provide access to the Upper Tangle Lakes for boaters. Instead of picnicking the area has been used as a campground. On peak weekends the area may have as many as fifty vehicles. It has four pit toilets, eight picnic tables with firepits, and one water well.

The boat launch provides access to the Upper Tangle Lakes Canoe Trail. Fishing is excellent for lake trout, grayling, whitefish and burbot.

Brushkana Creek Campgrounds. The Brushkana Creek Campground is located on the north side of the highway at milepost 104.5. The campground is located adjacent to Brushkana Creek which offers good fishing for grayling. It has twelve camping units, four pit toilets and one picnic shelter. Firewood is supplied.

A two mile loop trail begins at the campground, leads to an old bridge that crosses the Brushkana Creek, and follows the stream back to the campground.

On holiday weekends this campground is filled to more than capacity.

THE PUBLIC INFORMATION PLAN

Theme

Interpretation of an area should be planned and incorporated with a unifying theme. The theme usually depicts the general character or outstanding feature of an area.

Theme selection for the Denali Highway area was a difficult task because it is so large and diverse. It was decided that a theme of geology with emphasis on glacial geology would be followed after consideration of a number of possible themes.

The primary reasons for this selection are: (1) Denali visitors clearly indicated natural features were the number one subject of desired information, with geology rated as the number one natural feature of interest. The local residents of the area reinforced the selection of a geologic theme by rating geology high. (2) Geology is the single most outstanding feature of the Denali area. Mt. McKinley to the west, the Alaska Range to the north, the Wrangell Mountains to the east and mountains of lower elevations to the south establish a spectacular geologic frame about the Denali Highway. The visitor is exposed to a number of impressive glaciers and other outstanding glacial and geologic features as he travels the highway. It would be difficult to find an area which has greater geologic beauty and more variety of glacial features.

The geologic theme will be carried throughout the plan with a mountain silhouette backdrop on all signing, and emphasis on geology and glaciation in interpretation.

Objectives

Public information objectives are a direct outgrowth of the audience inventory and the natural resource inventory. It was possible from the audience inventory to determine what information the using public, as well as the local public, need and want in the Denali area. The natural resource inventory has made it possible to determine what significant resources the area has to offer, and serves as a data base from which information has been taken to form the basis of the plan.

After examination of both the audience inventory and the natural resource inventory it was possible to develop both general and working objectives for this information plan. Objectives are statements which specify what is to be achieved by a given effort; in this case information and interpretation. The objectives prepared for the Denali area were designed to guide development of specific programs and selection of appropriate informational media methods and facilities.

General Objectives

To develop a public information plan that will:

give the public a greater awareness and understanding of the natural resources of the Denali Highway area.

increase their awareness of recreation opportunities available.

help inform and protect the user from unforeseen dangers.

inform the public of the services which are available along the highway.

meet the interests and desires of the users, and in general, make his visit to the Denali Highway area more interesting, informative, safe and enjoyable.

Provide general plans for implementing the public information plan.

Working Objectives

To emphasize geology and glacial geology in interpreting the area and keeping with the selected theme.

To identify the mountain ranges and peaks so that the public may know what they are seeing.

To inform the public through interpretation, of the mountain building processes that formed the Alaska Range and the Wrangell Mountains and of the erosional processes at work today.

To build an awareness of the importance of the different vegetative communities in the overall ecology of the area by introducing vegetative information in discussions of other natural resources.

To inform the public of the great variety of wildlife species in the area and interpret such animals as caribou, ptarmigan and beaver.

To inform the public, through pamphlets, of the types of fish present in area lakes and streams, and the locations and access to the better fishing spots.

To inform the public of the visitor services available at the several lodges and inns along the highway.

To identify and locate, through a pamphlet and signing program, the recreational trails in the Denali area.

To use the standard BLM trailhead signs and develop an example sign plan.

To design a durable, easily maintained interpretive sign to be used at recommended interpretive turnouts. Designs will be complete enough to use for actual sign construction.

To design a premonitory road signing plan to alert the visitor to trailheads and interpretive pullouts.

To design the information to be incorporated into two visitor information centers, one located at each end of the highway, to orient visitors to the Denali area.

To locate the finest resource examples and locations of turnouts to interpret these resources.

To recommend and design interpretive pullout sites for maximum effectiveness and safety. Design will include a plan layout, location of interpretive signs, and parking lot design.

To develop an interesting, informative, and concise wording plan for interpretive signs.

To make general recommendations for a living history interpretive program using local residents as interpreters.

To develop cost estimates for each part of the information plan.

To develop a priority list for implementation of the Denali information plan.

Resources Recommended For Emphasis

The resources selected for emphasis in the Denali Highway information plan are: geology, wildlife, fish, vegetation, cultural-historical, and recreation. These resources were identified as high priorities for inclusion in the Denali Highway information plan by field investigation and by identifying both visitor and local resident interests. Emphasis placed on these resources should provide visitors to the area with the necessary information and knowledge to more thoroughly enjoy the variety of natural and recreation resources available in the Denali Highway area.

Geology

Geology was determined by field investigation to be the number one outstanding resource of the Denali area. It also attracted the most user interest and desire for interpretation. As previously discussed, geology forms the theme for the Denali information plan. Mountain building processes, glaciers and glacial features are subjects of particular interest to visitors and receive the major focus of the geologic interpretation.

Wildlife

Wildlife is an important part of the total scene of the Denali area. It rated high as an important resource for which more information was needed by both the visitor and local resident inventories. Wildlife interpretation is featured at several highway pullouts and focuses on species such as waterfowl, caribou, moose, and bear. Most visitors are interested in where they can see wildlife. Therefore, small signs

depicting wildlife species and places where there is a better than average chance of seeing them have been designed and recommended.

Fish

The fishing resources of the area were also rated high as a resource for which more information was needed. The type of information desired on fishing differed from that of geology, wildlife, and vegetation. Both visitors and local residents revealed that three types of fishing information were needed: (1) types of fish found in the Denali area, (2) where they could be caught, and (3) access information on the good fishing spots along the highway. This information was much more important than actual interpretive information on various species of fish. For this reason fishing information in the plan is largely restricted to fish types, fishing locations, and access information. In the past there have been some signs at lakes depicting fish information. The present plan recommends brochures instead of signs to communicate this information.

Vegetation

Although not rated as a high priority resource for information by visitors or local residents, the area's vegetation is interpreted to a lesser degree along the highway. The overall importance of vegetation to the Denali area's wildlife population and scenic values has been determined by field investigation to warrant some treatment at points where vegetation is particularly interesting. Alpine tundra, for example, is unfamiliar to many visitors and is a good subject for interpretation. The relation of slope, attitude, altitude, latitude and permafrost to vegetation are also good subjects for interpretation. Some interpretation of vegetation of the area will hopefully lead to a greater appreciation

and understanding of the Denali area and the struggle that plant materials have to sustain themselves.

Cultural-historical

The culture and history of the Denali area were ranked as the third most important resource of interest by highway users. The Denali Highway area is rich in Athabascan native history, gold mining history and current examples of gold mining, and colorful local residents. The resource certainly exists to present an interesting cultural and historical story of the Denali area to meet user desires. The living history and radio tape program recommendations in this plan are designed to take advantage of the area's cultural and historic resources through interpretation.

Recreation resources

Recreation was the second most important category for which information was desired by highway users. Fishing and trails information were rated as the most important types of recreation information desired by both highway visitors and local residents. For these reasons and because the Denali area has great potential for increasing visitor use of its fishing and trail resources, fishing and trails information is a major component of the Denali Highway information plan. The brochures and trail signing are both designed to inform the public of the opportunities and dangers involved in their recreation pursuits.

Program Outline

The Denali Highway information plan consists of six major components: visitor information centers, interpretive pullouts, information pamphlets, radio-tape programs and living-history interpretation programs.

The information contained in each component of the plan has been drawn from the resource inventory and worded to be accurate, concise and interesting. Signs and entrance station structures have been designed for durability, compatibility with the area, and ease of construction and maintenance. The total plan is simple, yet functional and if followed, could transpose the Denali area from one of potential, to one of the outstanding interpretive and recreational areas of Alaska.

Visitor Information Centers

A visitor information center should be constructed at each end of the highway. These stations would act as entry points to the highway and would serve to orient the visitor to the Denali Highway and surrounding area. The stations recommended by this information plan have been designed to fit the character of the Denali area and are oriented with sun angle and prevailing wind direction in mind. The following information should be presented at each station: (1) a large highway map showing the Denali Highway in relation to the major peaks of the Alaska Range and Mt. McKinley and the location of the several lodges and inns along the highway, (2) a listing of the lodges and inns along the highway and visitor services available at each, (3) Denali area weather and climate information--average annual snow and rainfall, temperature highs and lows, length of day and night during the different seasons of the year, prevailing wind direction and velocity, and the effects of the surrounding mountain ranges on Denali area weather, (4) general road information--the roadway is gravel from the Tangle Lakes west. Sign symbols and their meanings that will be encountered along the highway, the milepost locations of the sixteen interpretive pullouts and two visitor information centers on the highway should be explained.

An interpretive sign should be placed at each visitor information center. The interpretation on the east center sign, near Paxson, would describe the mountain building processes that formed the Alaska Range while information about Mt. McKinley should be presented in the signing at the west station, near Cantwell.

The existing BLM Denali Highway brochure along with the recommended fishing and trails brochures should also be available at each visitor information center. The information contained in these brochures would further orient the visitor of facilities and recreation opportunities the Denali Highway has to offer.

Interpretive Pullouts

In addition to the two visitor information centers, sixteen interpretive pullouts have been recommended by the plan and should be established. Selection of these turnouts was a difficult task because the Denali Highway presents outstanding opportunities for interpretation at many points along its length. The locations finally selected were judged by field investigation to represent the best examples for interpretation of geology, glaciation, wildlife and vegetation, and are in most instances well suited for construction of turnout facilities.

The interpretive pullouts are simple in design, consisting of an interpretive sign and a graveled parking lot for an average of ten to fifteen vehicles. Toilet facilities have not been recommended for either of the visitor information centers or any of the sixteen interpretive pullouts. Such facilities were not deemed necessary because they exist at both Paxson and Cantwell, and at the several inns and lodges along the highway. They serve as a basic visitor service, helping to draw business to these establishments. Picnic facilities have not been specifically recommended

because they are available at both the BLM campgrounds at Brushkana Creek and the Tangle Lakes. Such facilities are optional and it may be advantageous to add them as dictated by future demands.

Signing Programs

The signing component of the Denali Highway information plan consists of three parts: (1) interpretive signs at each of the sixteen interpretive pullouts and each visitor information station. Geology, mountain building processes, glaciation and glacial features, wildlife and vegetation will be interpreted at these points; (2) trailhead signs at each hiking, four-wheel drive and canoe trail. The standard BLM trailhead sign design is recommended for each trail described by the trails inventory. Information contained on each trailhead sign should include trail name and map, trail distance, type of trail--hiking, four-wheel drive, standard vehicle; trail difficulty in relation to type of trail--easy, moderately difficult, very difficult; points of interest along the trail, and dangers that may be encountered on the trail. A sign-in, sign-out trail register should also be established at each trailhead as a separate unit. Trail registers would serve as visitor safety checks if checked on a regular basis; (3) symbol signs should be placed a standard distance from each interpretive pullout and trailhead to act as premonitory or warning signs to alert the visitor that they are approaching a trail or interpretive pullout. These signs are standard symbols to designate what type of interpretation or trail is ahead. Similar standard symbols for geology, wildlife and hiking trails are used by the

National Park Service and Forest Service quite successfully. Premonitory or symbol signs are recommended not only as a visitor service, but also as an attempt to standardize and bring uniformity to signing along the highway.

Symbol signs are also recommended at points along the Denali Highway where the visitor has a better than average chance of spotting wildlife such as moose, ptarmigan, and caribou.

Each type of sign in the signing program is standardized as to construction, design, height, and color. Interpretive and informational messages have been developed for each pullout and trailhead sign, and are presented in the signing section of the plan.

Pamphlets

Informational pamphlets on Denali area fishing and trails are an important component of the Denali area information plan. They have been designed to provide information on locations, access, types of trails or fish to be found in the Denali area. Each pamphlet has a map locating the various fishing lakes and streams or trails along the highway.

Radio-tape program

This component of the information plan is primarily a set of recommendations as to what can be done with this form of informational media. No attempt has been made to develop a radio tape program but an example tape using local residents, has been provided to the Bureau of Land Management

as a basis from which to develop a "final product" tape. Such a tape would help give the visitor a "feel" for the Denali area.

Living History Interpretation

A set of recommendations has been made to help the BLM develop a living history interpretation program for the town of Denali and other locations along the route. Local residents could be used as living history interpreters and gold mining and Indian history could be emphasized. Such programs have been successful throughout the United States and provide the visitor with an enjoyable first-hand personalized lesson in history.

Summary

Each of the six major components of the public information plan for the Denali Highway is an integral part of the whole plan. Each component requires a working set of plans, which, if implemented, should meet a part of the desires and needs of the users of the area.

The plans for the entrance stations, interpretive pullouts, signing programs, and information brochures are presented in the following sections. No details are given for the radio-tape and living history programs due to the time and cost limitations of developing the plans for these programs. Yet they should be considered important components of the overall Denali Highway information plan. Therefore, general recommendations have been made as guidelines for development of the tape and living history programs.

PROGRAM PLANS

Signing Program

Interpretive Turnout Sign

The interpretive sign design to be used at each turnout and the visitor centers is a basic U. S. Forest Service podium type sign that has

been modified for use by the Bureau of Land Management along the Denali Highway.

The podium design was chosen for its rugged appearance and construction that blend with the character of the Denali area, its ease of maintenance, and because it was felt that this design would be most resistant to vandalism, harsh weather conditions and temperature extremes.

The basic podium design is an attractive structure with steel reinforced concrete legs and an angled sign panel for easy reading. Modifications have been made to both sign height and mounting panel shape. Sign height has been changed from 14 to 18 inches above ground at the front of the sign mounting panel. This alteration was made because it was felt that the original dimension was too close to the ground thereby inviting people to climb onto the sign.

The sign mounting panel was changed from the original rectangular shape to a trapezoidal shape to resemble the BLM logo. The modified shape will add design interest, and will better represent the Bureau of Land Management as the sponsoring agency of the Denali Highway information plan. Sign mounting panel is to be constructed of redwood and kept in its natural color.

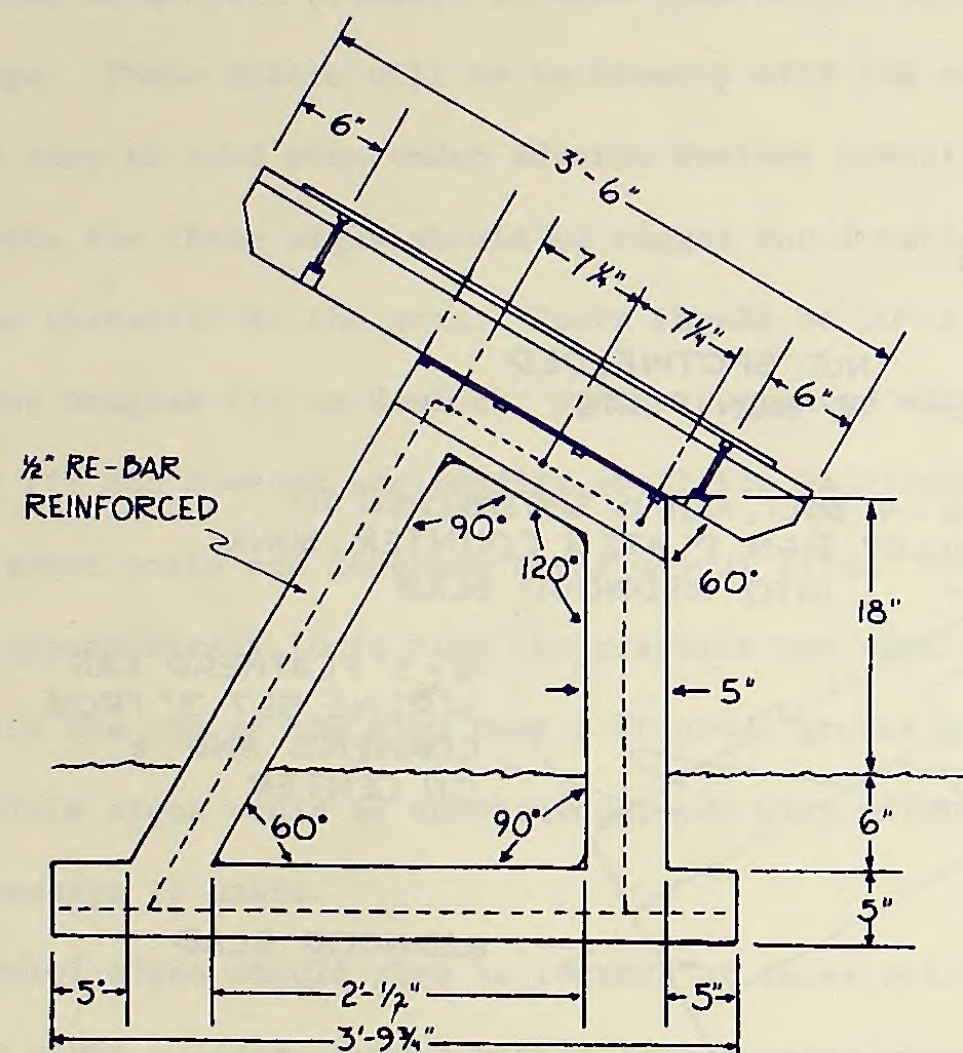
The sign plate itself is an aluminum alloy plate manufactured by the Permaloy Corporation of Ogden, Utah. It is produced with a photo-chemical etching process that can reproduce both photographs and photographable art work in colors ranging from dark to light bronze. Signs are available in any shape and range from 1 inch by 1 inch to 48 inches by 60 inches. Sign plate thickness ranges from 1/16 inch to 3/8 inch. Fastening methods can also be tailored to a particular design. This process is guaranteed for 25 years and barring vandalism, the Permaloy process should give 50 years of outdoor life. Process details and ordering information are contained in Appendix B of this report.

The Permaloy sign plate was selected for its beauty, versatility and long life guarantee. It has also been highly recommended by the National Park Service in Denver, Colorado.

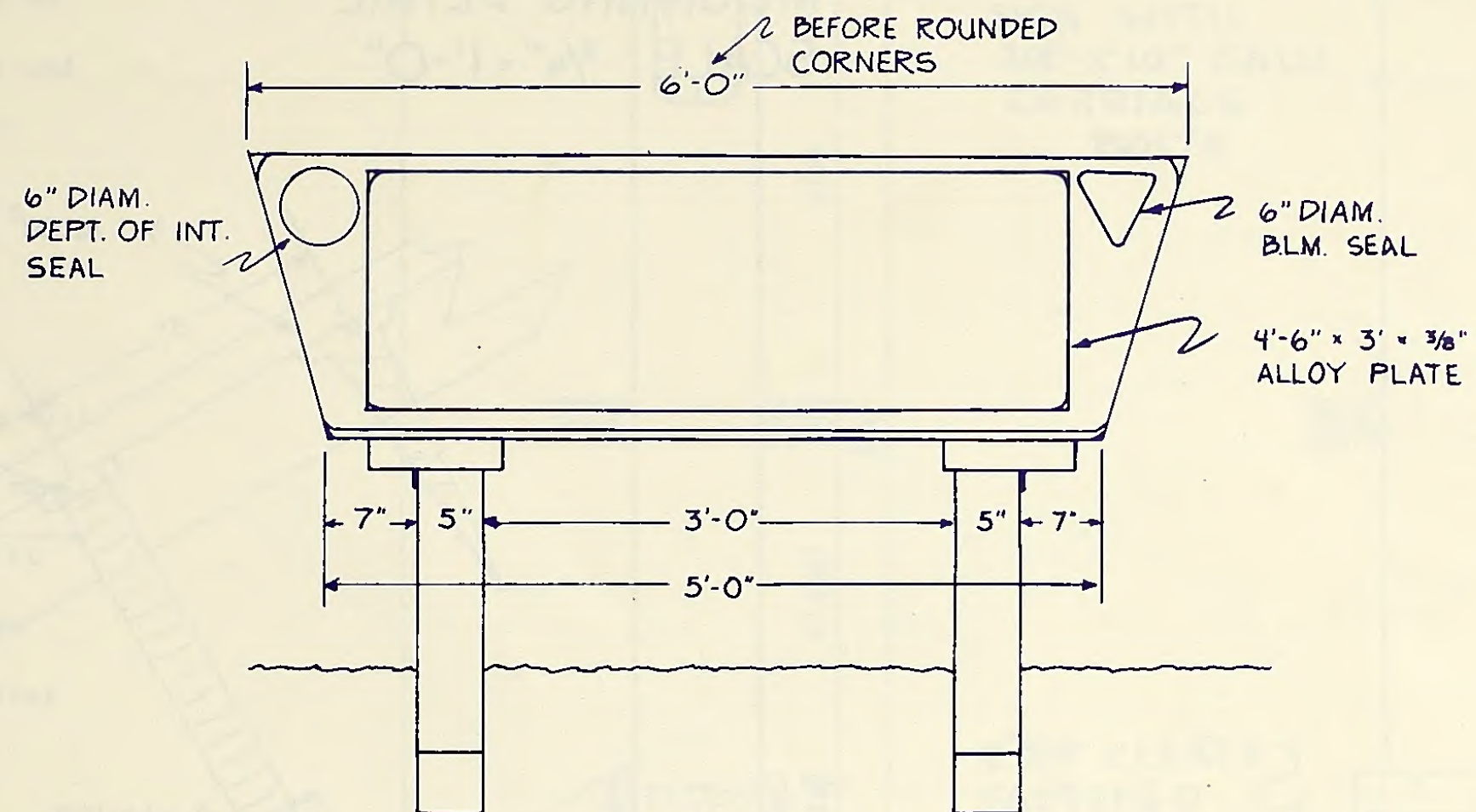
The sign design and mounting details are presented here and on page 54.

Permaloy pamphlets and signing information are contained in Appendix B of this report.

INFORMATION SIGN podium type



SIDE VIEW
SCALE: 3/4" = 1'-0"



ELEVATION
SCALE: 3/4" = 1'-0"

FIG. 1

NOTES:

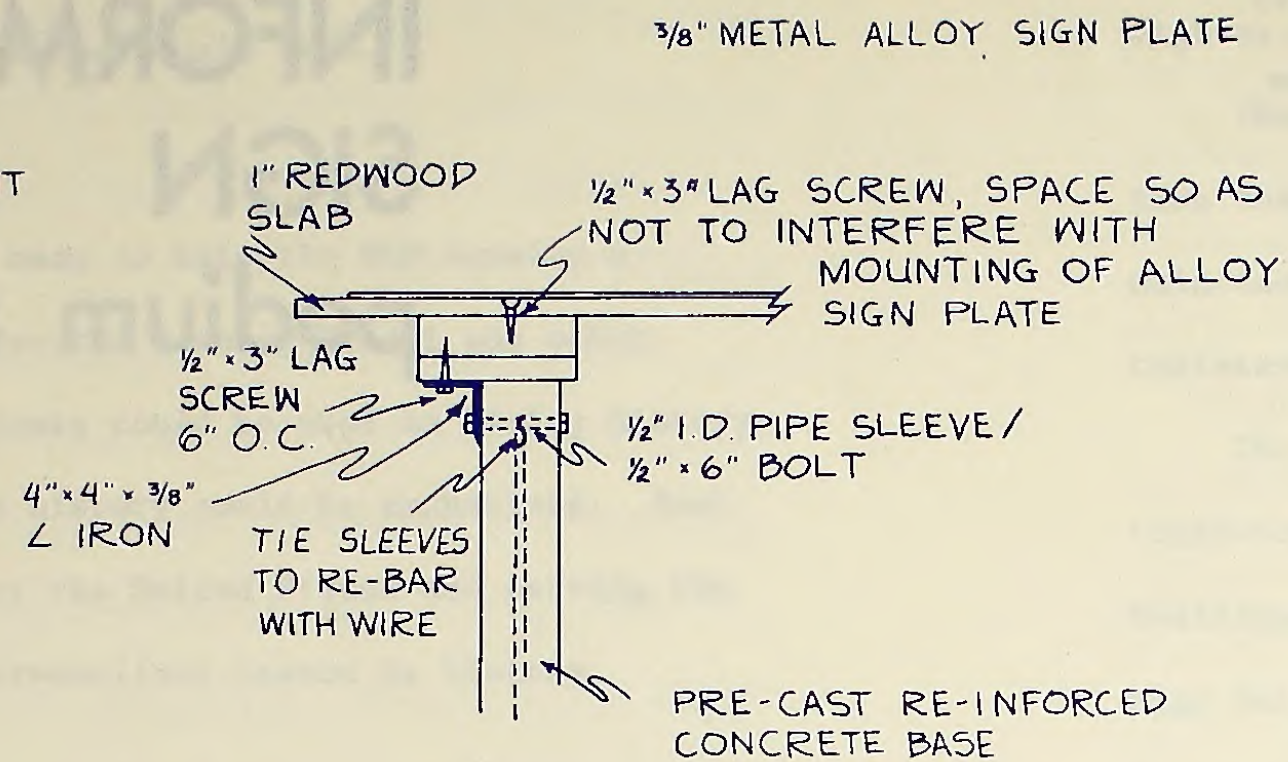
PRECAST CONCRETE UNITS
170 LBS. EACH (LIGHTWEIGHT
AGGREGATE)

DAVIS COLOR MIX TO CEMENT
4 LBS. CHOCOLATE BROWN
(6145) PER SACK OF CEMENT

4 LBS. MEDIUM BROWN (6145)
PER SACK OF CEMENT

3 LBS. CANYON RED (1117)
PER SACK OF CEMENT

TREAT EXPOSED HARDWARE
WITH RUST PREVENTATIVE



MOUNTING DETAIL
SCALE: 3/4" = 1'-0"

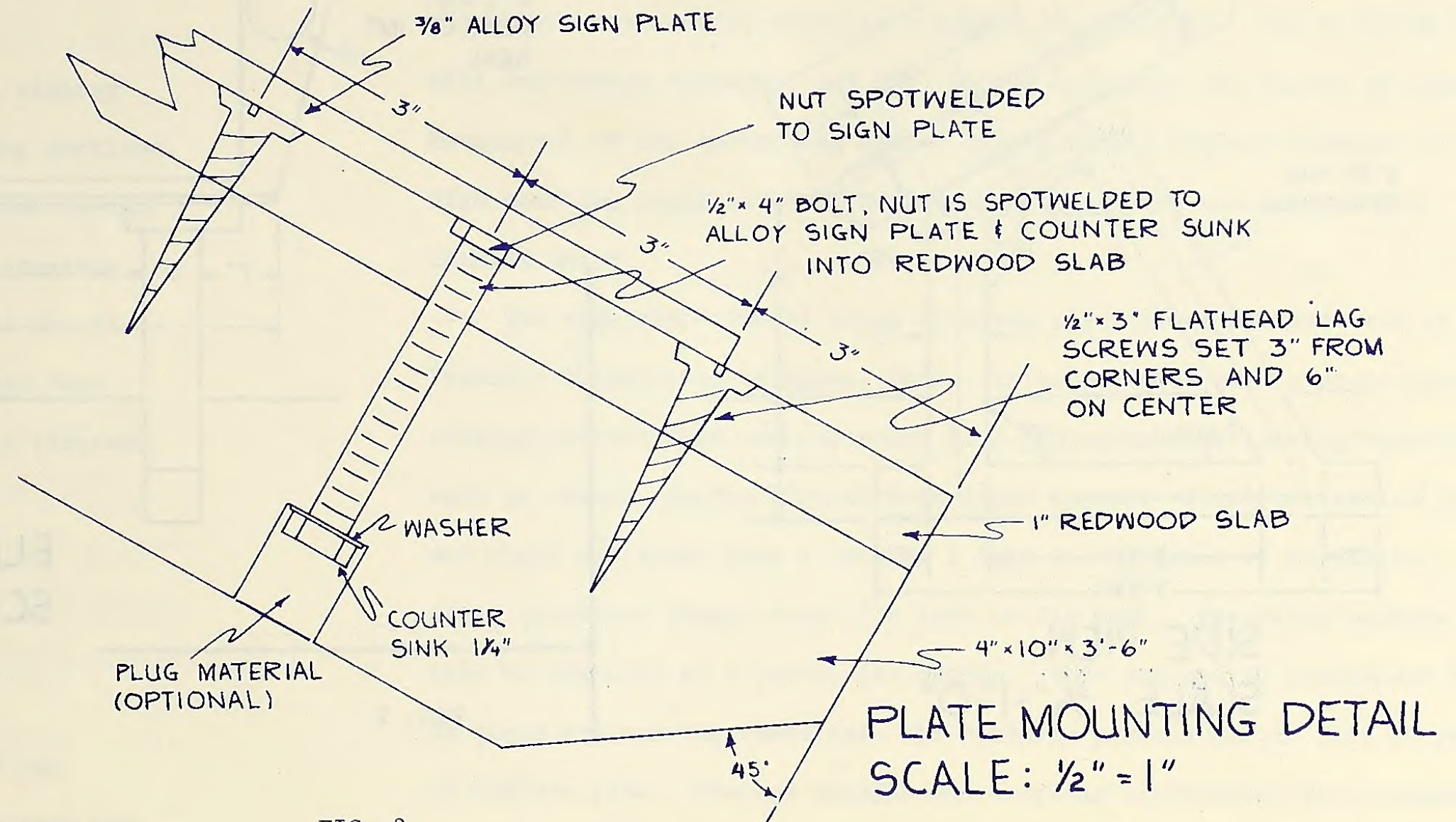


FIG. 2

Premonitory Signs

Premonitory or warning signs should be established at a standard distance in both directions from interpretive pullouts and trailheads to alert the public of forthcoming points of interest. A standard maximum distance from each pullout or trailhead should be 1/4 mile. This could be adjusted to a minimum of 1/8 mile according to vegetation or terrain conditions. Premonitory signs should be symbol signs such as those now in use by the National Park Service and U. S. Forest Service. They should be printed on 1/8 inch plastic for economy and ease of replacement. A color combination of black letters on a light grey background is recommended for the signs which should be mounted on a black creosote treated post as per specifications on this page. These colors will be in harmony with the surroundings and will be easy to read even under adverse weather conditions.

Posts for these signs should be rugged and durable in keeping with the character of the area. Posts should be 10" x 10" x 6', rough cut Douglas fir or Hemlock, pressure treated with creosote. Douglas fir and Hemlock are readily available in Alaska; creosote will weatherproof posts and lengthen their useful life. Posts should be placed approximately 10 ft from the roadside and should be set 3 ft deep with the top of the sign post 3 ft above ground level. These low profile signs would be unobtrusive, yet will effectively deliver their message to users.

Symbol signs should also be located at those points along the highway where visitors have a better than average chance of seeing wildlife such as moose, caribou and ptarmigan. A map on page 56 suggests locations along the highway for these signs.

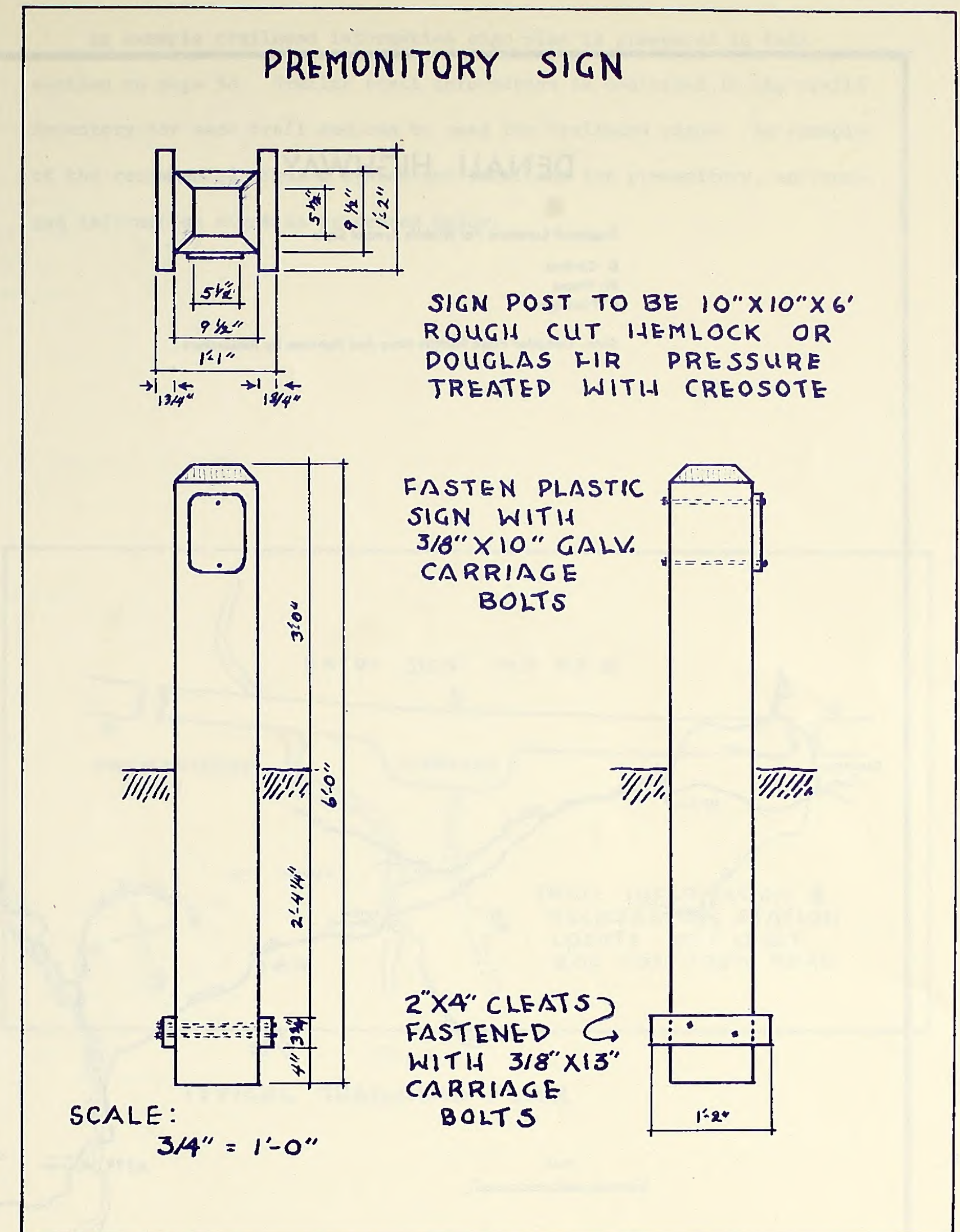


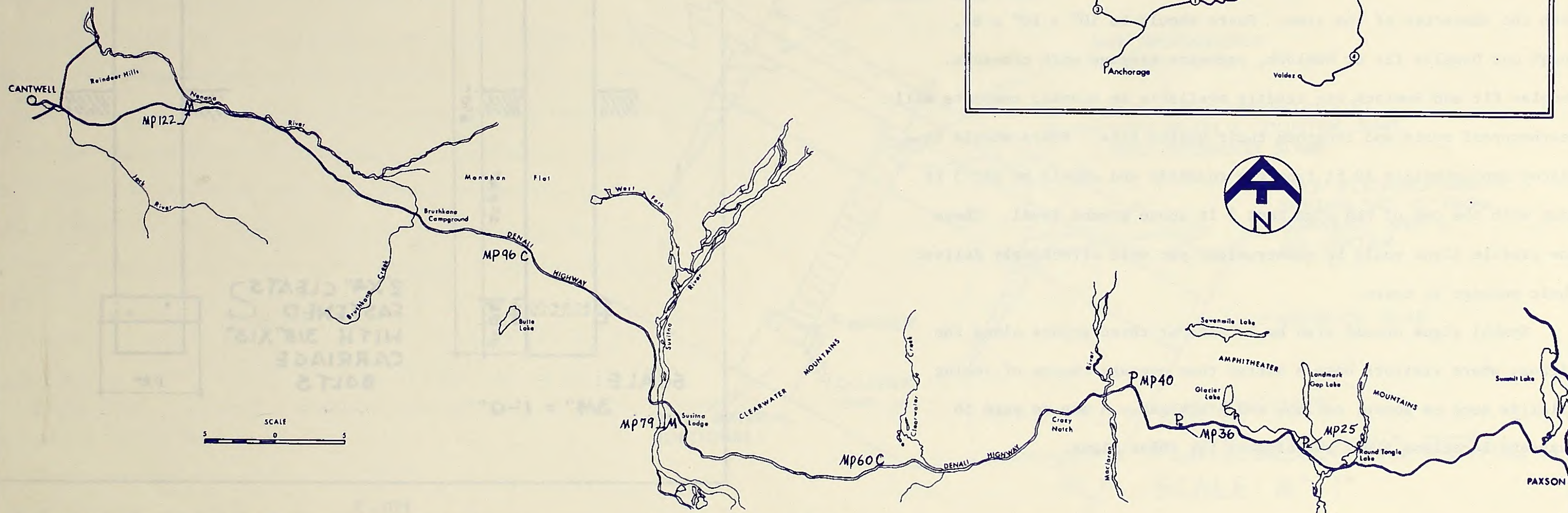
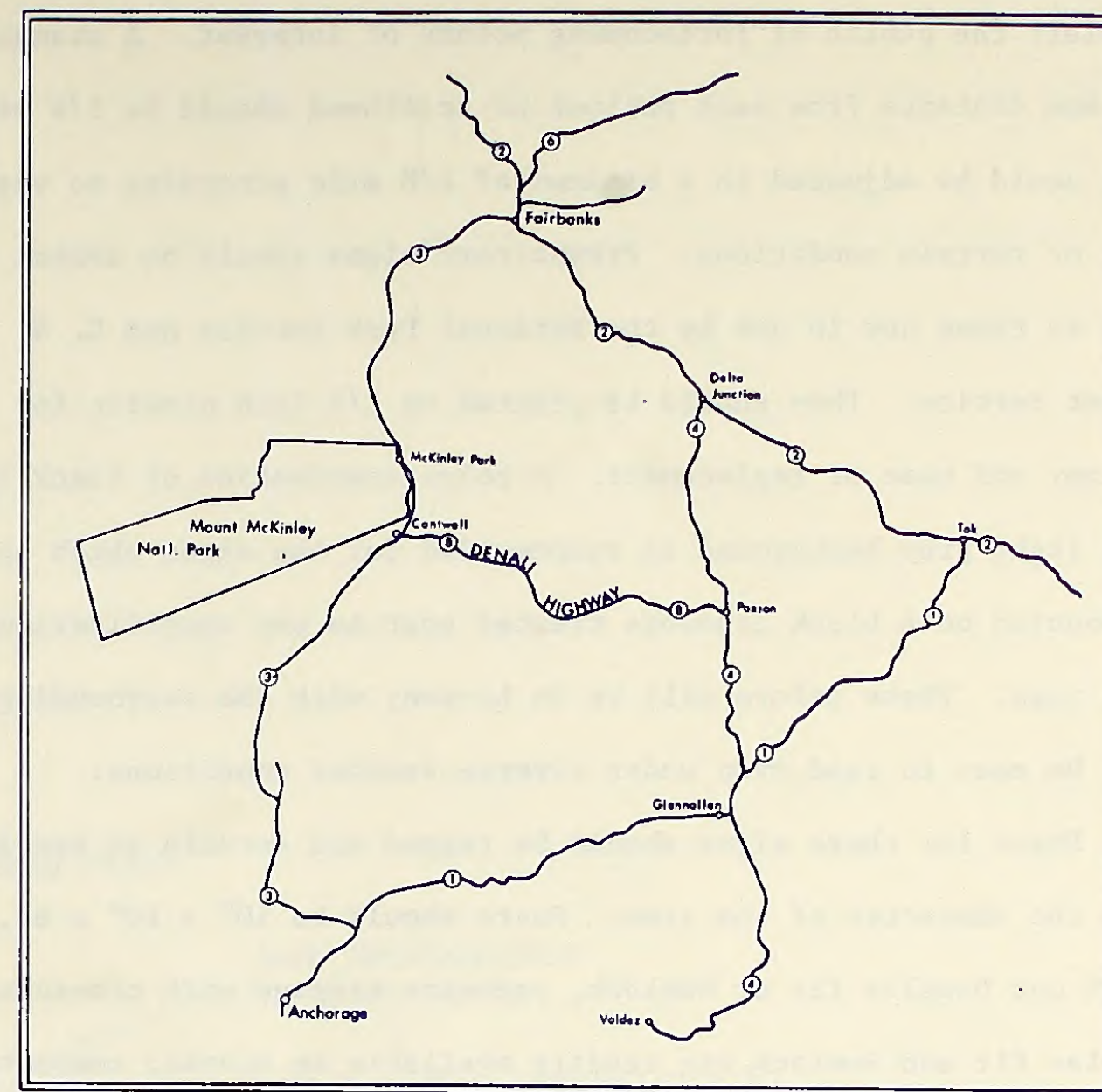
FIG. 3

DENALI HIGHWAY

Suggested Locations For Wildlife Symbol Signs

C - Caribou
M - Moose
P - Ptarmigan

Note - Compiled From Wildlife Maps And Sightings By Researchers



Trailhead Signs

The standard BLM trailhead sign design should be used at each existing recreational trailhead described by the trail inventory. Information contained on each trailhead sign should include the trail name with a simple map, give distance, type, difficulty, points of interest and dangers that may be encountered.

Premonitory or trailhead warning signs should be placed along the highway 1/8 to 1/4 mile in each direction from the trailhead. An entrance, or name sign, should be placed directly across the highway from each trailhead to definitely locate it for the user and make it visible. A trailhead information sign should be placed approximately 1/8 mile up the trail from the trailhead. This placement will help to eliminate vandalism of these informational signs.

Several trails along the highway now have old gravel borrow pits serving as parking areas. These should be graded, cleared of rock rubble, accumulated trash, and other debris. Parking areas should be established for 10 to 12 cars at those trailheads where parking areas are not present.

Trail registers should also be established next to each trailhead information sign. These registers are a user safety feature and should be checked daily during the summer months if they are to be effective. If these registers cannot be checked at least every two days then they should not be established until such time that they can be properly checked and maintained.

An example trailhead information sign plan is presented in this section on page 58. Similar trail information is contained in the trails inventory for each trail and can be used for trailhead signs. An example of the recommended signing system and locations for premonitory, entrance, and information signs is presented below.

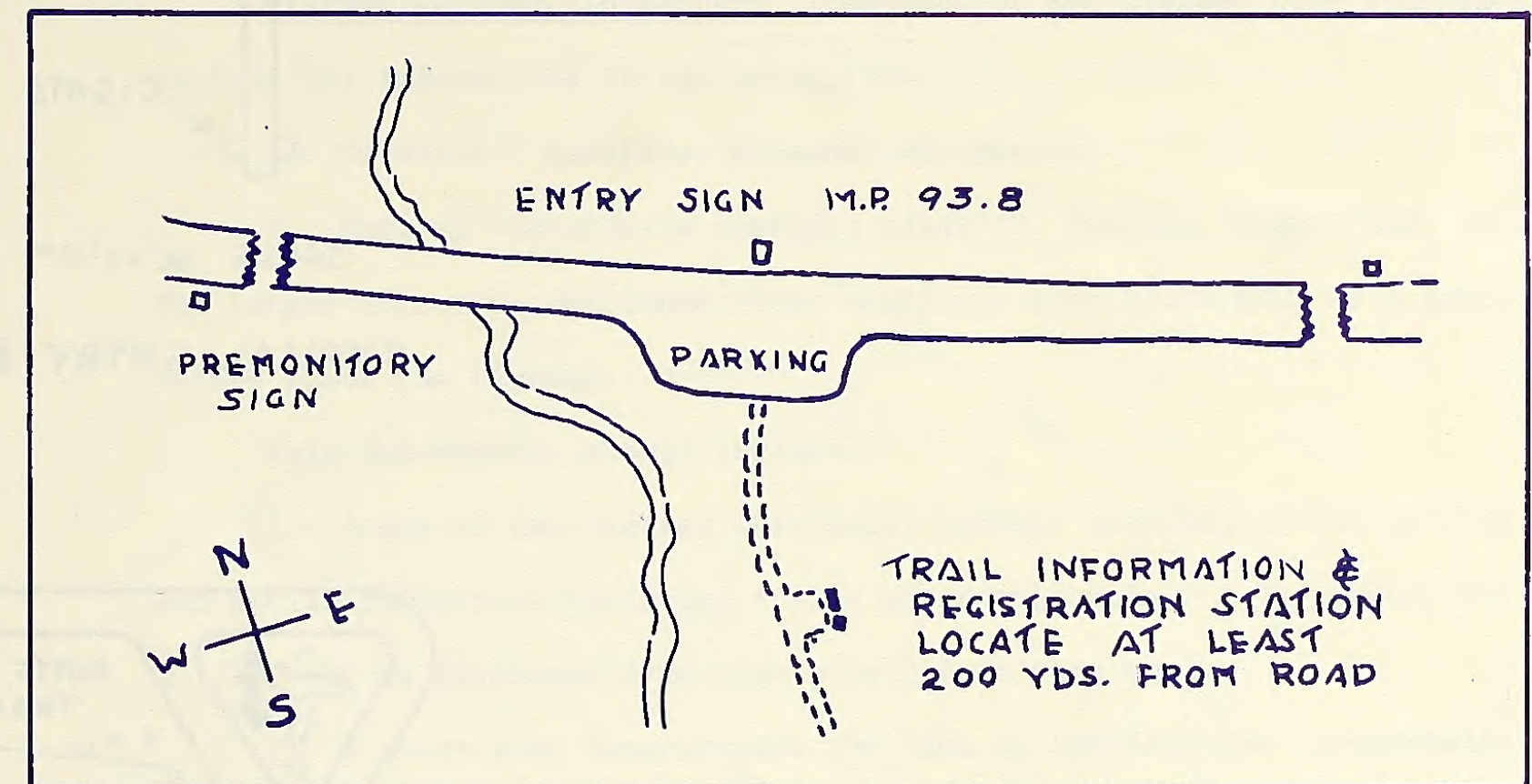
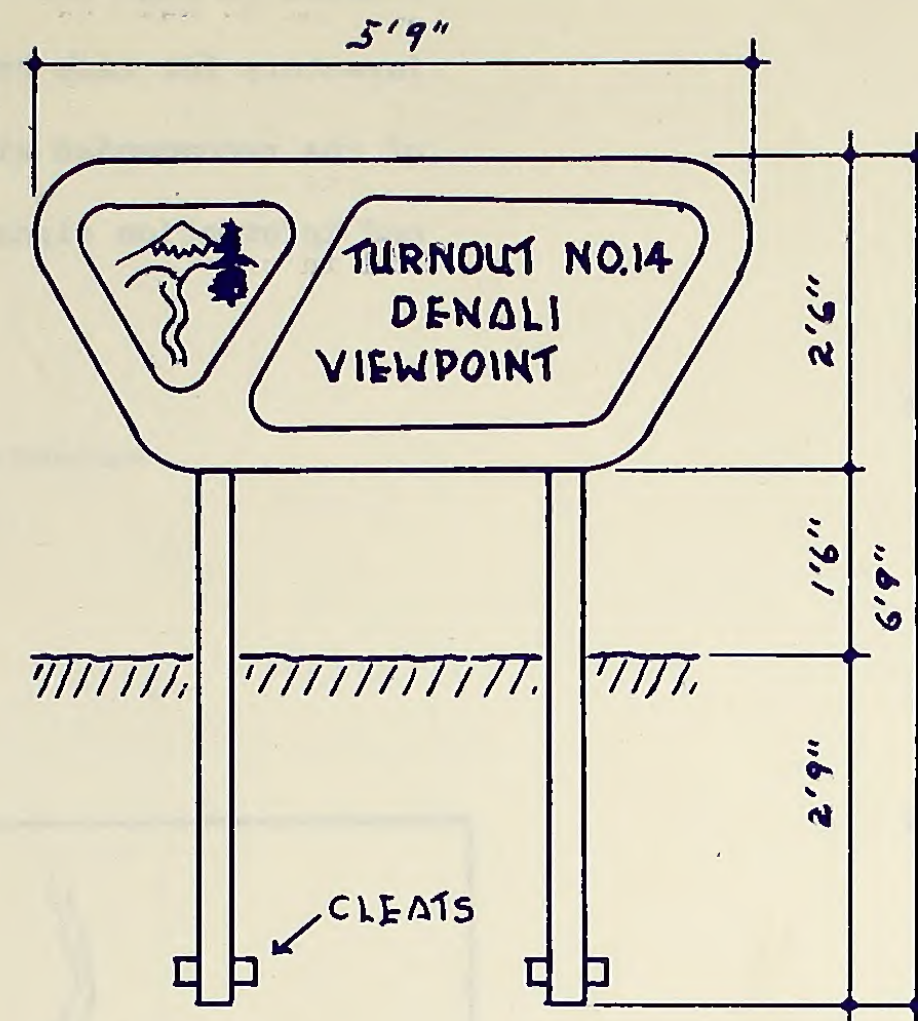


FIG. 4

TYPICAL TRAILHEAD PLAN



SCALE $\frac{1}{2}" = 1'-0"$

TYPICAL ENTRY & TRAILHEAD SIGN

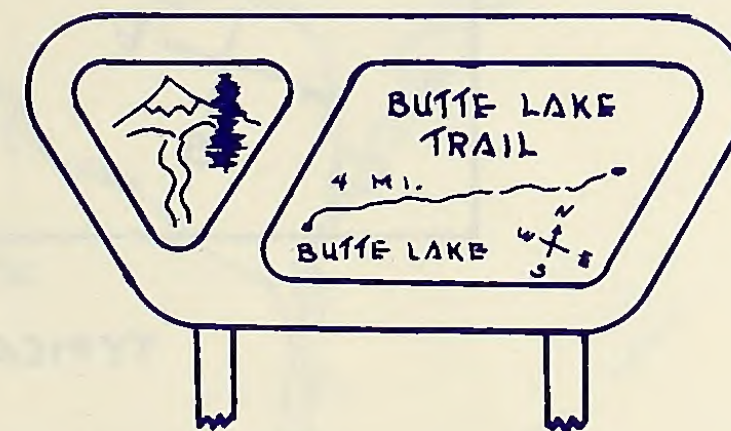


FIG. 5

TYPICAL TRAIL INFORMATION SIGN

Interpretive Turnout Program

Eighteen pullouts that include two Visitor Information Centers have been selected along the Denali Highway for visitor interest and satisfaction. Sites were selected that should have a high degree of interest to the traveler. Each site was carefully planned with safety in mind at all times. Each stopping point should be on a straight stretch of highway with safe grades and good visibility for vehicles traveling through, and for those entering and leaving the parking areas. (Refer to turnout map, p. 96.)

Warning or premonitory signs should be placed 1/8 to 1/4 mile from each turn out for information and safety. Entry signs should be placed so that they are easily visible. They may be put on either side of the highway.

The following section describes both Visitor Information Centers, each individual interpretive pullout, and the interpretive sign wording and suggested sign illustrations for these pullouts.

Turnout Number 1 - Visitor Information Center Paxson (see site plan page 61). This pullout is located 6.2 miles west of Paxson and is at an elevation of approximately 3400 ft. Vegetation in the immediate vicinity consists of the high brush vegetative ecosystem along the highway and the low brush muskeg bog vegetative ecosystem to the north.

This area offers excellent views of the Gakona and Gulkana Glaciers to the northeast, Summit Lake to the north and the broad expanse of the Alaska Range with numerous peaks above 12,000 ft from east to northwest. Paxson Mountain lies 3 miles to the south at an altitude of 5,200 ft.

The turnout proposed is situated on reasonably level terrain along a straight portion of the roadway. The turnout would be on the north side of the road. A large area as much as 5 to 6 acres is available for this site. It is undisturbed land and would require some cleaning and grading.

It is suggested that parking be arranged for approximately twenty vehicles and half of this number should be prepared for vehicles with trailers.

Features of this site include a structure in three parts: a larger central structure would house information relevant to the highway and the area in general. The two flanking, smaller structures would house information relevant to the local features. A self-guiding nature trail is also designed for this area to arouse interest in local features and other features along the highway. It would also serve to encourage people to leave their automobiles at the very beginning of their Denali experience for those traveling west. It would be a farewell point for those traveling east and would remind them of pleasant experiences along the route.

Visitor Information Center. Travelers of the highway have expressed desires for information in two categories:

1. Services - gasoline, propane and repairs.
2. Natural resources - geology, wildlife, fishing, vegetation, etc.

The larger structure mentioned above would provide information of a general nature about the highway.

This information should include:

1. A map of the highway that would exhibit location of all private and public facilities including trails and campgrounds. A large map, 12' x 3 1/2', may be developed from maps provided in this study.
2. A chart that demonstrates the type of services and accommodations that can be expected at each private establishment along the route. See page 39.
3. General road information - sign meanings, conditions, grades, traffic, etc. This may be developed from information provided in this report and from seasonal information taken from the field.

4. General information regarding weather and climate in order that the visitors may better understand the interpretive materials about geology and vegetation. This may be developed from information provided on pages 33 and 34.

5. Geology of the area. Basic information regarding the mountain building processes and erosion is provided on page 62.

6. Handouts for trail and fishing information as provided with this report and the BLM highway information brochure. Others may be introduced as needed.

Subjects of local interest that may be interpreted at this point are the Alaska Range, its magnitude, highest and most rugged peaks, and famous climbs. This location provides a good view of the Gulkana, Gakona, and several other glaciers, therefore glacial processes and glacial erosion are also pertinent subjects for interpretation at this location.

Several other subjects of local interest may be interpreted through podium type signs along the short, self-guiding nature trail as outlined on the site plan. Any number of locations could be placed along this trail. The following is suggested wording for seven proposed signs:

1. Paxson Mountain - Elevation 5,226 ft.
2. Black Spruce - a tree common to arctic regions. Although they have no commercial value, they serve as shelter and food for wildlife in extreme weather conditions.
3. Dwarf Willow - a valuable food and cover plant for wildlife in arctic regions. Look for ptarmigan, hare, and other wildlife where this cover plant exists.
4. Gakona Glacier lies 15 miles to the northeast. It is one of the larger glaciers in this region, approximately 2 miles wide by 6 miles long.

5. Gulkana Glacier lies 13 miles distant. It is easily accessible by a service road off the Richardson Highway.

6. Summit Lake - stream piracy occurs when one stream erodes the land until it invades another stream and takes that stream's flow into its own course. The Gulkana River that flows into Summit Lake was recently pirated and as a result, Summit Lake is gradually clearing of glacial silt and undergoing dramatic ecological change.

7. Alaska Range - Several peaks that reach above 12,000 ft can be seen in the distance. The mountain range extends in a great arc from Cook Inlet through the Mt. McKinley massif located to the west, to the Yukon Border to the east, a distance of 650 miles.

Visitor Information Centers will be the most important stops to the traveler. It will orient him and help him to anticipate his trip over the highway.

The following messages on glacial geology, mountain building processes, and erosion should be presented at the Paxson Visitor Information Center.

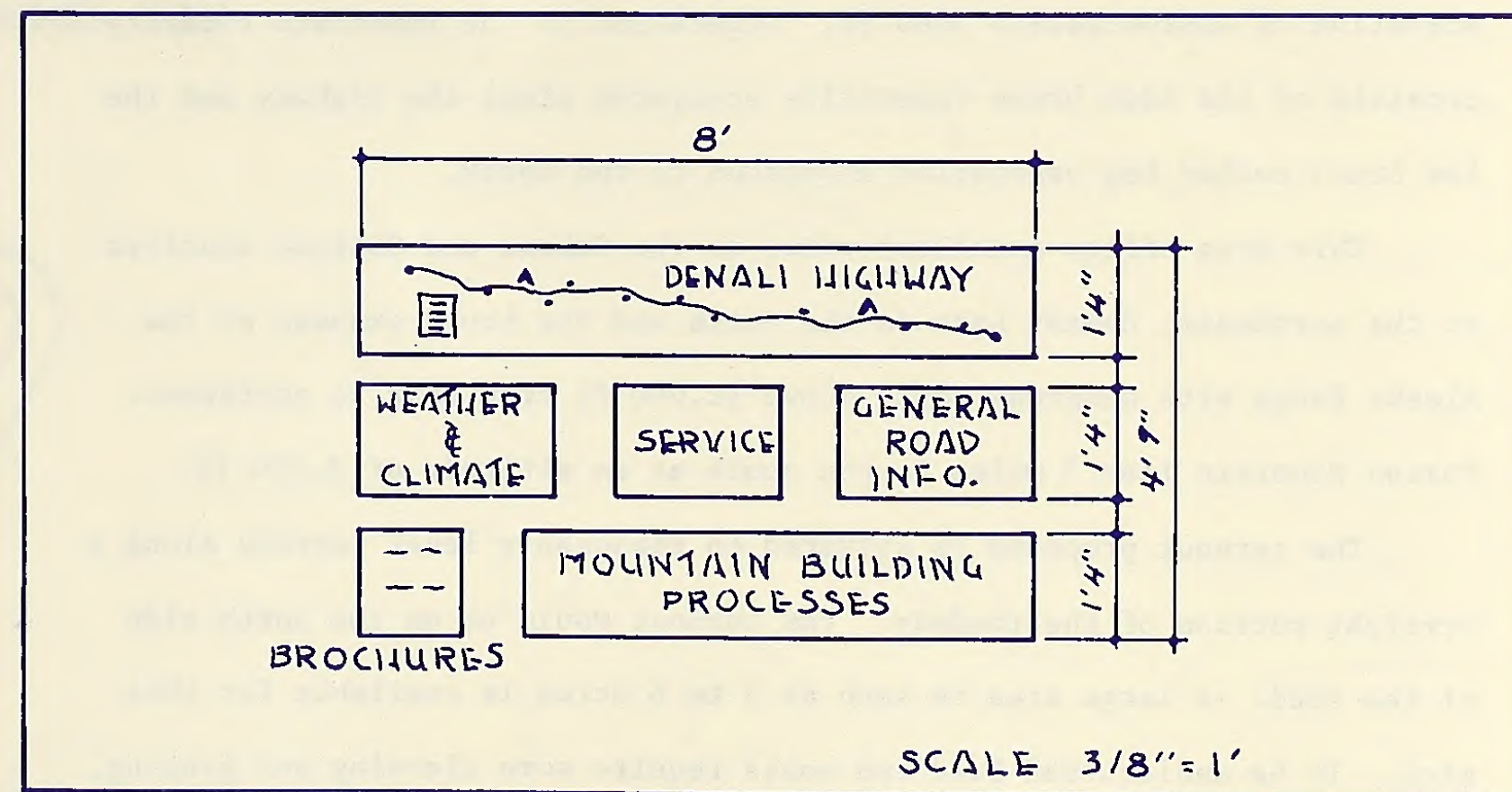


FIG. 6

INTERPRETIVE SIGNS VISITOR INFO. CENTER PAXSON

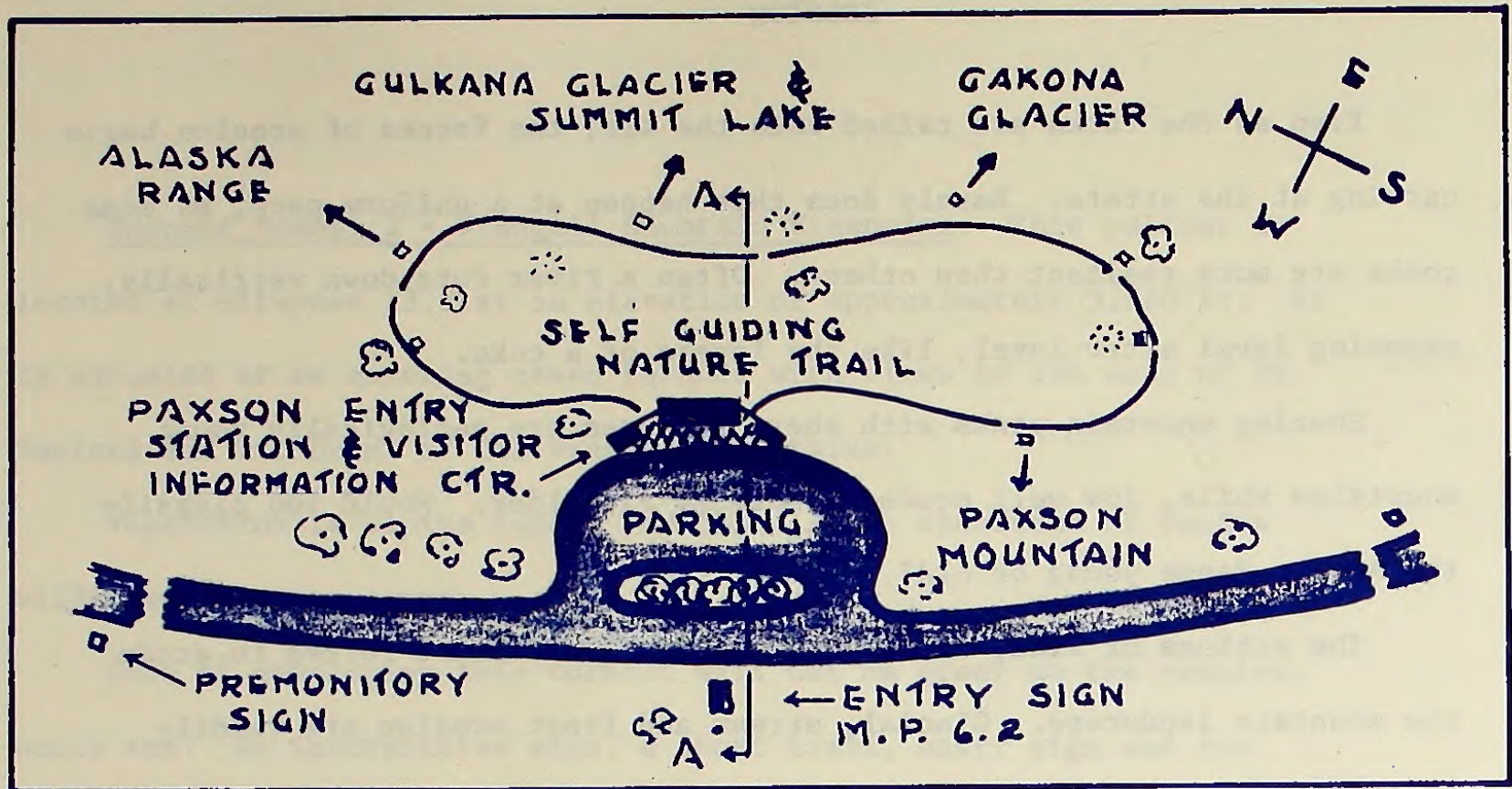


FIG. 7

SITE PLAN FOR PULLOUT NO. 1

The Gulkana and Gakona glaciers, seen from this point have formed as a result of the buildup of snowfields high in the mountains. Layers of snow accumulate year after year and are compacted into ice by the pressure of their own weight. As the glacier becomes heavier it begins to move downslope or flow, scraping and gouging the rock over which it passes. This gouging, scraping action, or glacial erosion is responsible for the rugged, jagged appearance of the Alaska Range.

The rock debris eroded by glaciers collects along their edges as lateral moraines. When two glaciers merge, a middle or medial moraine is created by the mergence of the lateral moraines at that point where the glaciers contact each other. These lateral and medial moraines collect at the glacier's end point, or terminus, to form an end moraine.

Interesting, glacially formed features such as kettle lakes, eskers, and moraines are visible along the highway and have been interpreted for your enjoyment at the turnouts along the route.

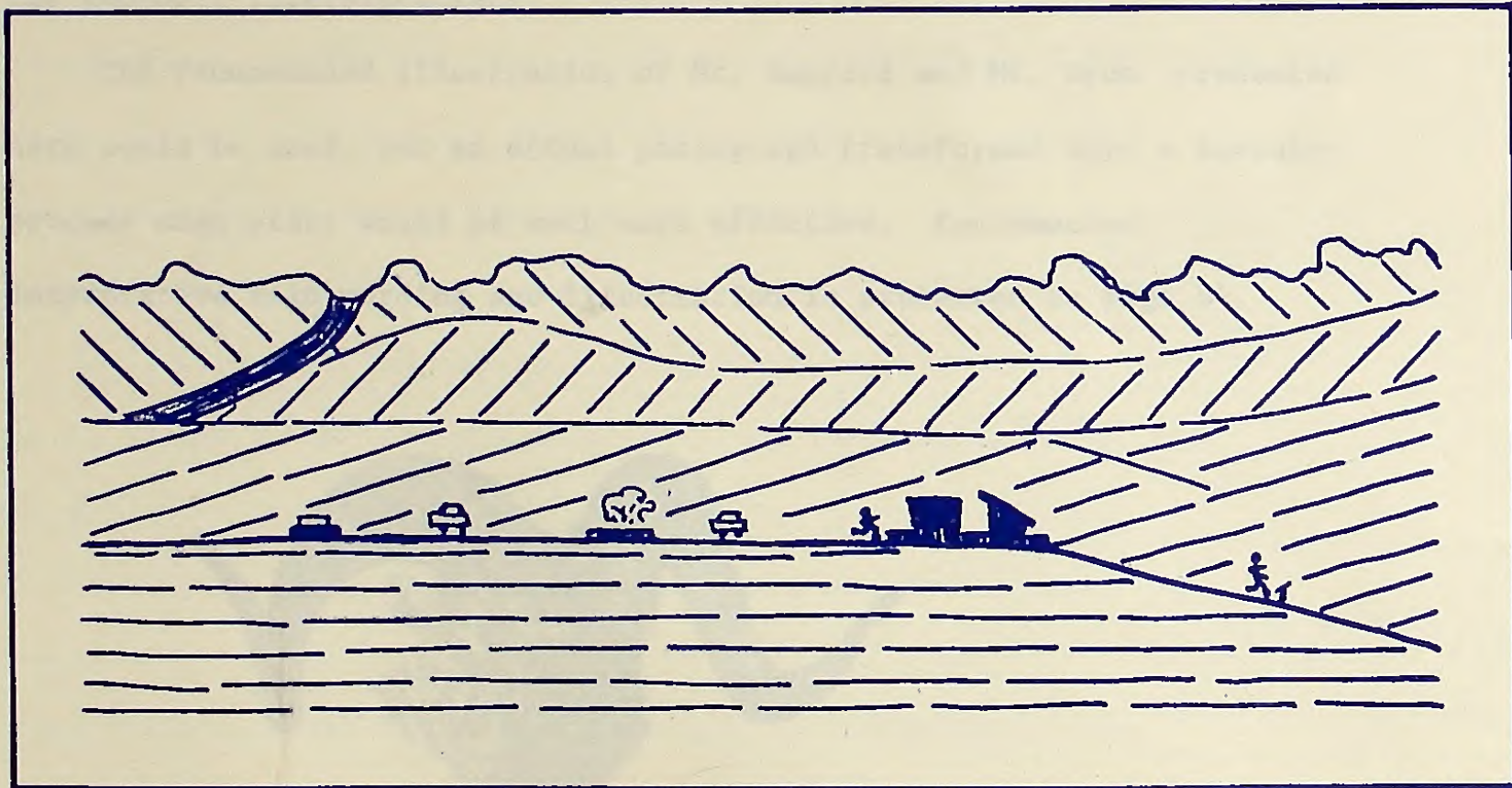


FIG. 8

SECTION AA

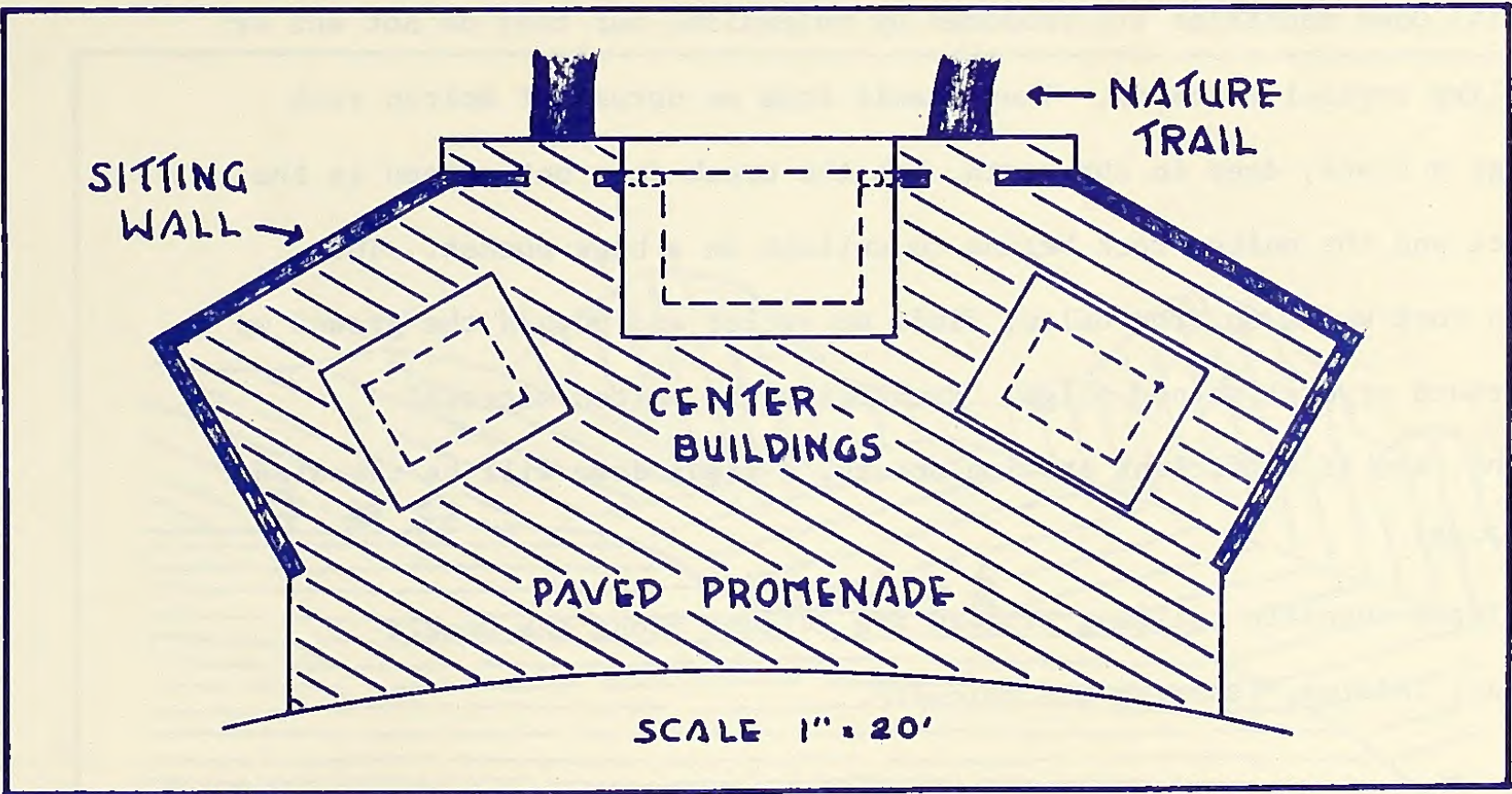


FIG. 9

PAXSON VISITOR INFORMATION CENTER

MOUNTAIN BUILDING PROCESSES

What power could have raised the land and shaped it into this magnificent mountain range?

Mountains can grow in any of four ways:

(1) There can be a pushing together of part of the earth's surface.

If this is done with a rug, ripples rise up in the center. The same thing happens to the crust of the earth, and "folded" mountains result.

(2) "Faulted" mountains are distinguished by great sheer faces of rock. They are formed when underground pressure forces one whole mass to break clearly from another, on one side the rocks rise; on the other they subside.

(3) Mountains are formed by volcanic action, by an uprush of material from deep in the earth in sufficient quantity to actually create a mountain by depositing a huge pile of lava or cinders on the earth's surface.

(4) Dome mountains are produced by volcanism, but they do not act or look like typical volcanos. They result from an uprush of molten rock through a crack, deep in the earth, but the crack does not extend to the surface and the molten rock begins to collect in a huge pocket. The molten rock wells up from below, finds no outlet and pushes the ground up in a round or oval shaped bulge. Eventually the molten material hardens, and if sufficient erosion occurs, a great dome will be revealed (42:37-38).

Three mountain building process are evident along the Denali Highway; folding, faulting and volcanic.

EROSION

Even as the rocks are raised into the air, the forces of erosion begin carving at the strata. Rarely does this happen at a uniform pace, as some rocks are more resistant than others. Often a river cuts down vertically, exposing level after level, like the layers of a cake.

Soaring mountain peaks with sharp features are geologically young mountains while, low well eroded mountains are older. Would you classify the Alaska Range young or old?

The actions of wind, water, and temperature combine forces to erode the mountain landscape. Glacial, stream and frost erosion are readily apparent along the Denali Highway.

Turnout Number 2 - Wrangell Mountain Viewpoint. This pullout is located at milepost 13.3 at an elevation of approximately 3,750 ft. It is situated at an existing paved turnout with views to the east of Mt. Sanford and Mt. Drum of the Wrangell Mountains.

Vegetation is alpine tundra and there is an abundance of tundra wildflowers in the summer.

Cost of developing this turnout will not be great as the requirements are: an interpretive sign, a short trail, entry sign and two premonitory signs.

This site was selected for its outstanding view of the Wrangell Mountains to the southeast of the Denali area. The Wrangells are tall, spectacular, and volcanically formed, making them an excellent subject for geologic interpretation.

The recommended illustration of Mt. Sanford and Mt. Drum presented here could be used, but an actual photograph transformed into a Permology process sign plate would be much more effective. Recommended Interpretive sign wording and illustration is presented on page 64.

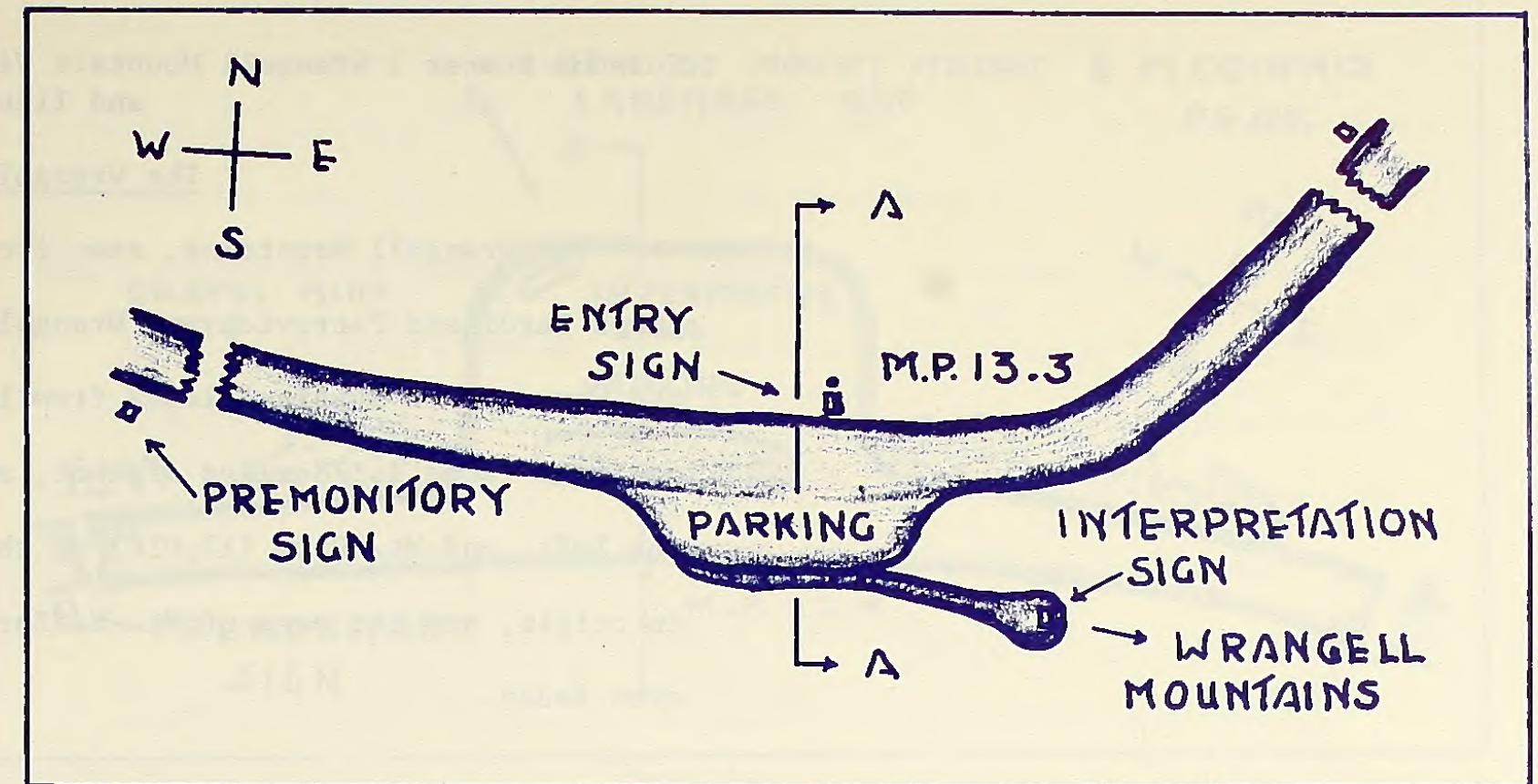


FIG. 10

SITE PLAN FOR PULLOUT NO. 2

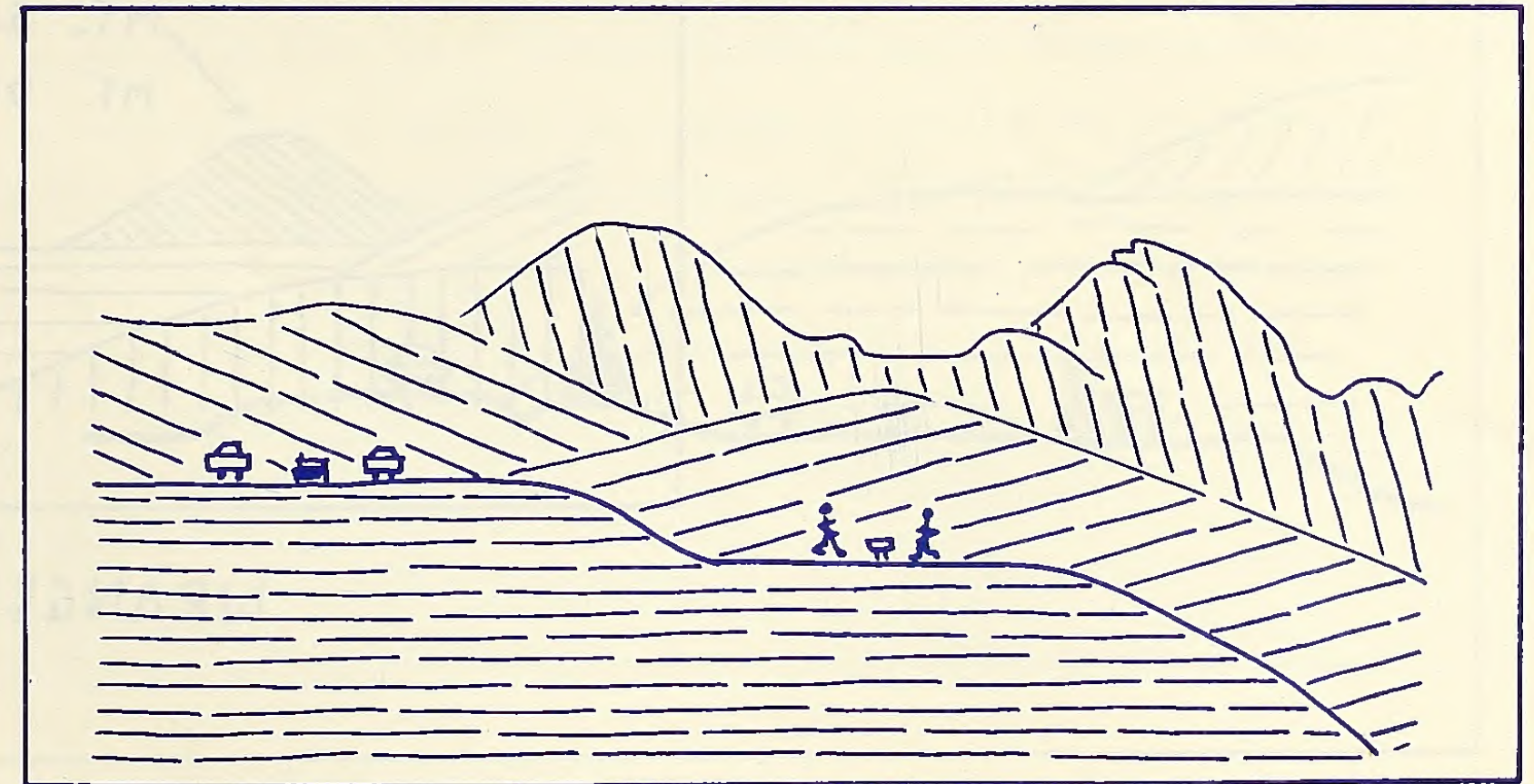


FIG. 11

SECTION A A

Turnout Number 2 Wrangell Mountain Viewpoint Interpretive Sign Wording
and Illustration

The Wrangell Mountains

The Wrangell Mountains, seen from this point, take their name from Baron Ferdinand Petrovich von Wrangell, vice-admiral in the Russian Navy, and governor of Russian Alaska from 1830 to 1835. This 100 mile long mountain range is 78 miles distant, and features Mt. Sanford (16,237) on the left, and Mt. Drum (12,010) on the right. The Wrangells are volcanic in origin, and the cone of Mt. Sanford shows signs of volcanic activity even today.

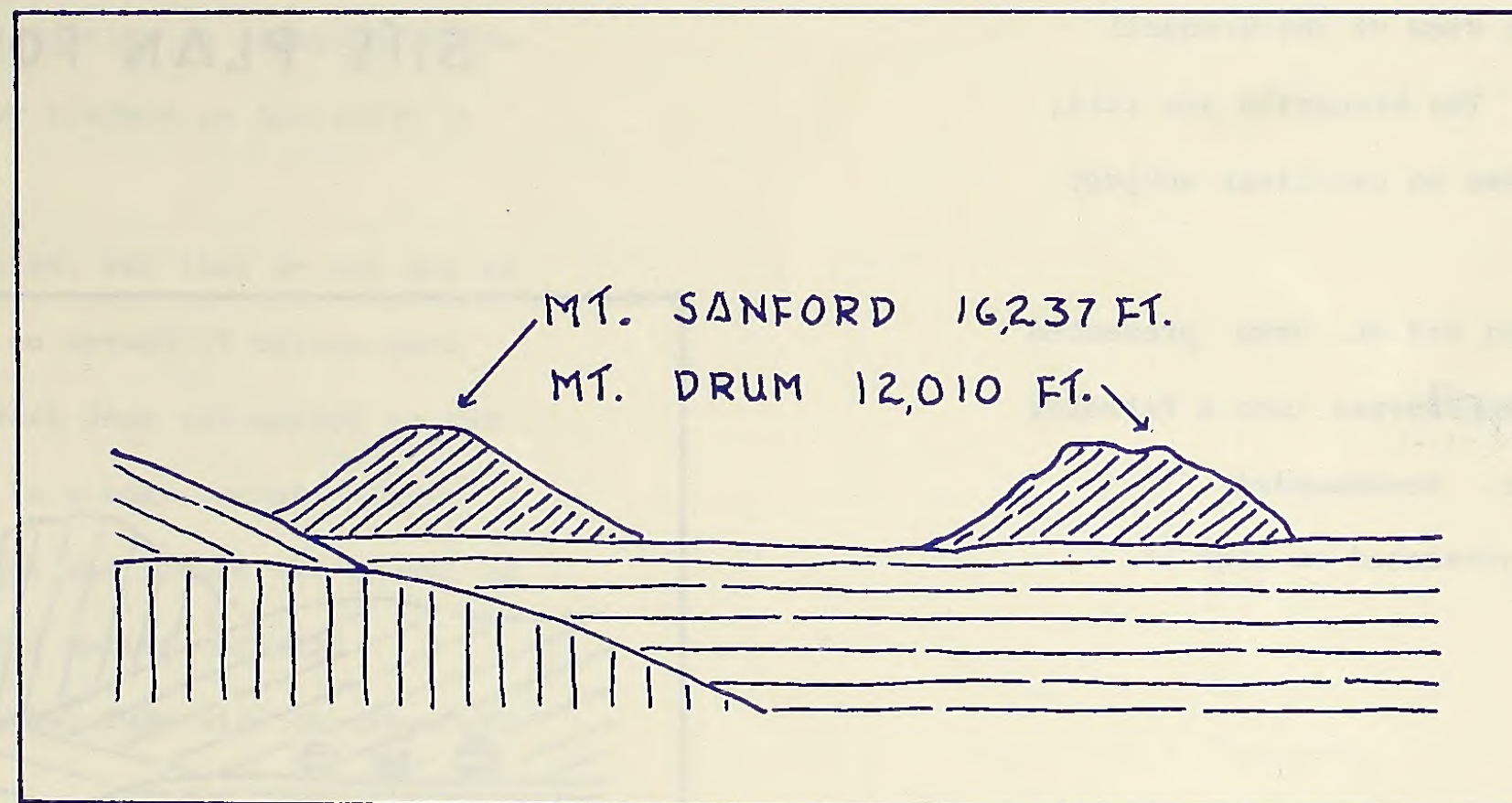


FIG. 12

WRANGELL MOUNTAINS

Turnout Number 3 - Landmark Gap Viewpoint. This pullout is located at milepost 22.4 at an elevation of approximately 2900 ft. It is located at an existing gravel pit with a "picture postcard" view of 11,400 ft McGinnis Peak and 13,020 ft Mt. Moffit through Landmark Gap.

Vegetation is low brush. This is good habitat for ptarmigan and good forage for caribou.

Cost of developing this site will not be expensive. Cleanup and grading of the gravel pit is necessary. Other items include: an interpretive sign, entry sign and two premonitory signs.

Location of the entry sign is optional, i.e., it may be located on the opposite side of the road from the parking.

This site was selected for its view of Landmark Gap, McGinnis Peak and Mt. Moffit.

Recommended interpretive sign wording is presented below:

Landmark Gap

In front of you is Landmark Gap, a glacially scoured cut in the mountains, formed during the Pleistocene ice age more than 10,000 years ago. The Gap has historically been a caribou migration route and a favorite Indian hunting area in centuries past.

Indians were heavily dependent upon caribou for the essentials of life - food, clothing, and shelter. The Nelchina caribou herd, formerly numbering about 70,000 animals adequately provided these needs. In recent years the herd has been reduced, through over hunting and habitat disturbance, to about 10,000, but still use the Landmark Gap area as a migration route.

The mountain peaks visible through the Gap are McGinnis Peak (11,400 ft) and Mt. Moffit (13,020 ft).

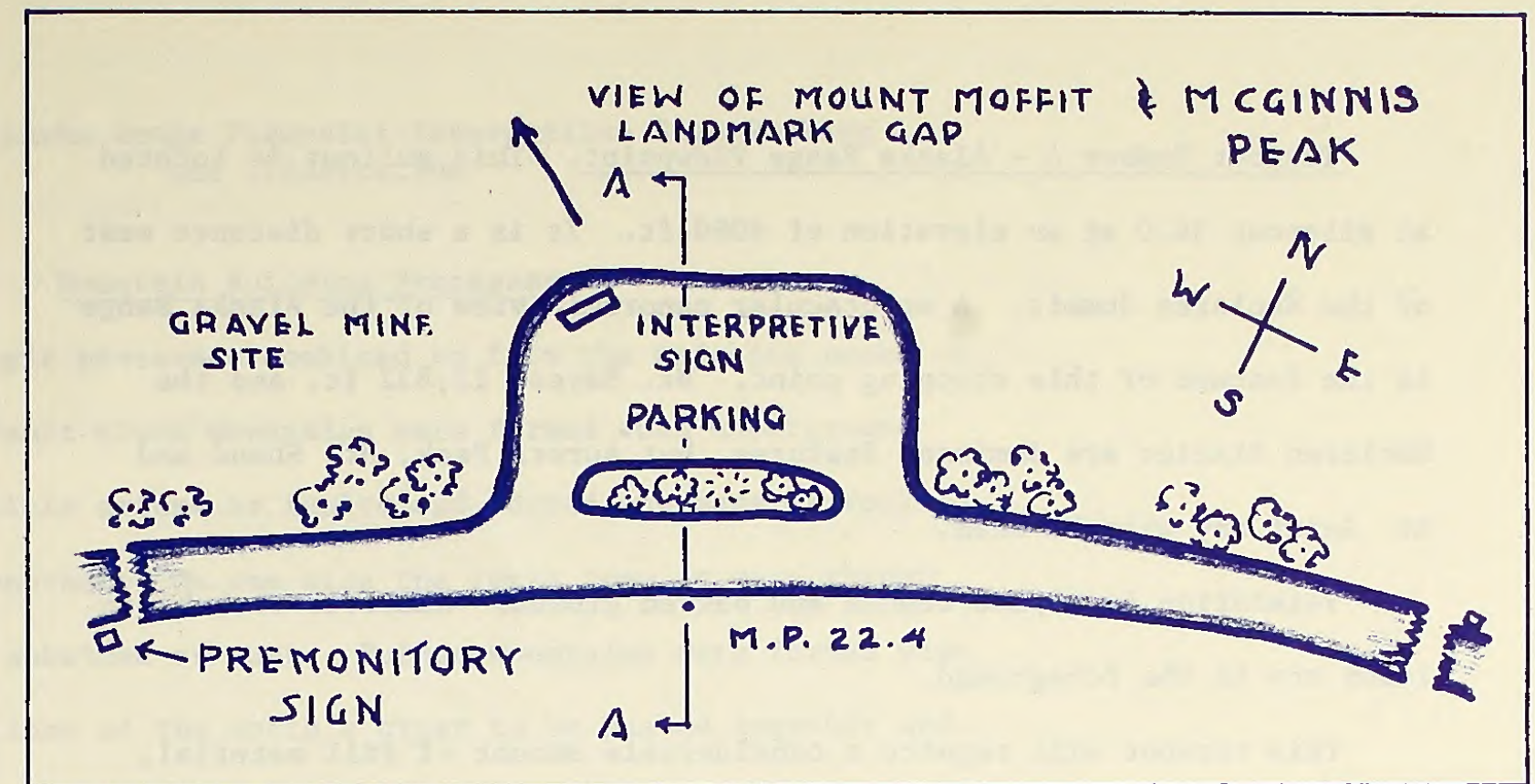


FIG. 13

SITE PLAN FOR PULLOUT NO. 3

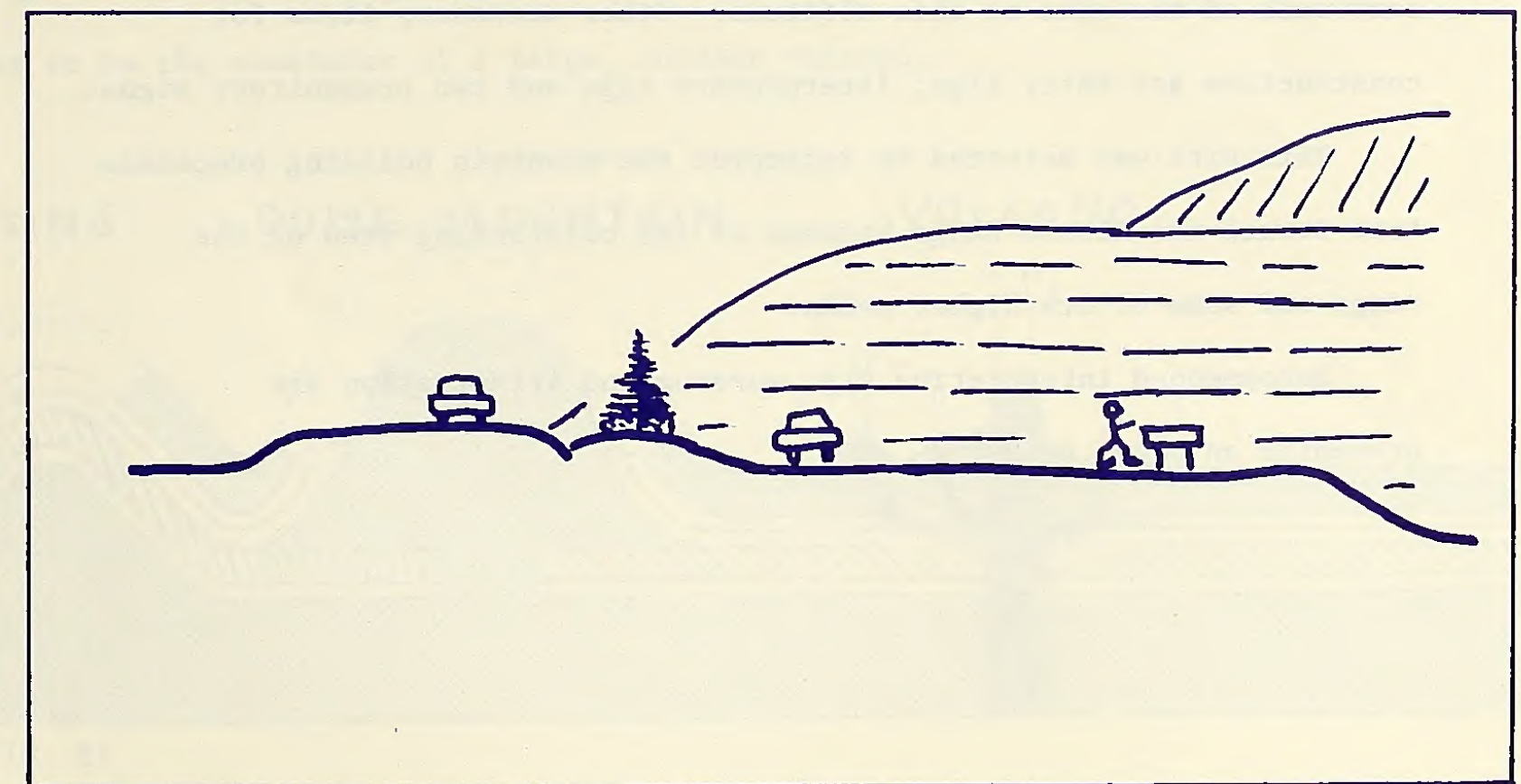


FIG. 14

SECTION A A

Turnout Number 4 - Alaska Range Viewpoint. This pullout is located at milepost 36.0 at an elevation of 4060 ft. It is a short distance west of the Maclaren Summit. A spectacular panoramic view of the Alaska Range is the feature of this stopping point. Mt. Hayes, 13,832 ft, and the Maclaren Glacier are dominant features, but Aurora Peak, Mt. Shand and Mt. Geist may also be seen.

Vegetation is alpine tundra and barren ground. Numerous rock basin lakes are in the foreground.

This turnout will require a considerable amount of fill material, grading and construction of some steps on a very gradual sloping trail. The trail would be advantageous from two points, it would be less expensive to construct and would be easier access with less hazard when covered with snow. Location is on a north slope, therefore it will have snow much of the time at this altitude. Other necessary items for construction are entry sign, interpretive sign and two premonitory signs.

This site was selected to interpret the mountain building processes that formed the Alaska Range because of its outstanding view of the range and some of its higher peaks.

Recommended interpretive sign wording and illustration are presented on page 67.

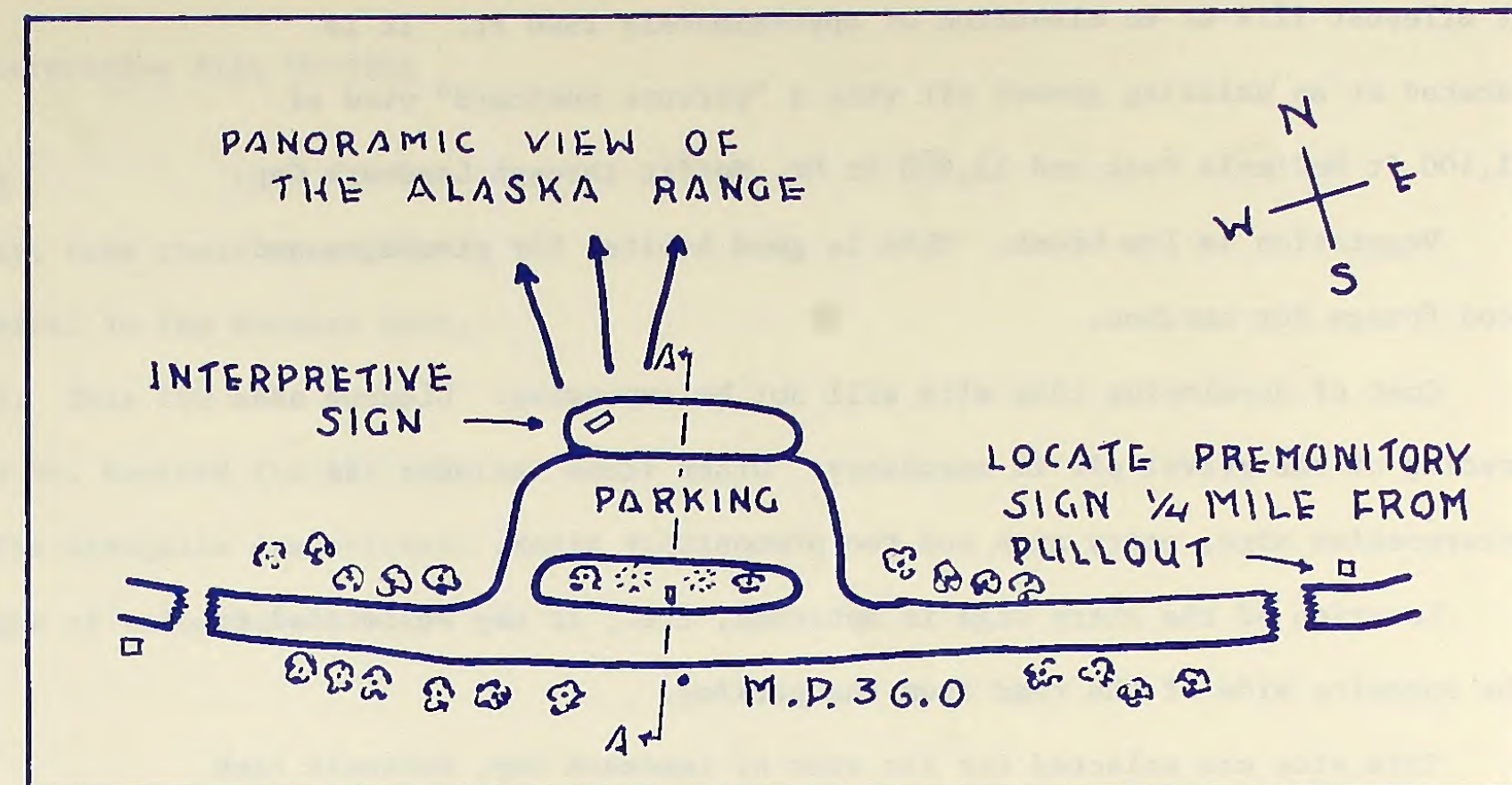


FIG. 15

SITE PLAN FOR PULLOUT NO. 4

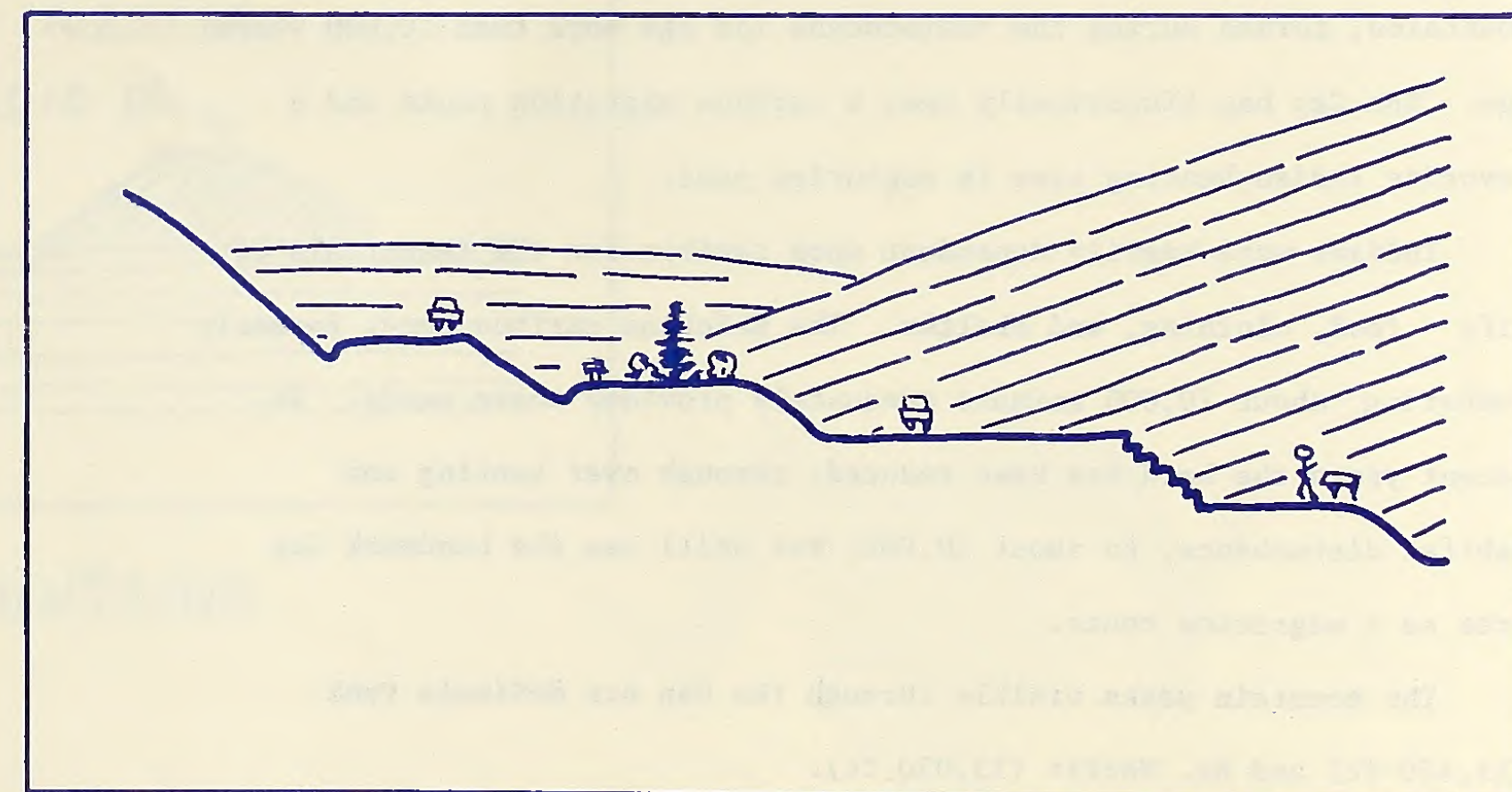


FIG. 16

SECTION A A

Turnout Number 4 - Alaska Range Viewpoint Interpretive Sign Working and Illustration

Mountain Building Processes

Two major geologic processes combined to form the majestic peaks of the Alaska Range. Fault block mountains were formed when underground pressure caused vertical cracks or faults and forced one mass of rock to break cleanly from another. On one side the rocks rose or were thrust up, while the other subsided or sunk. Folded mountains were formed when pressure caused portions of the earth's crust to be pushed together and "folded," much as a rug ripples in the center when pushed together. A third process, that of volcanism, also acted to build mountains in this area. The Wrangell Mountains to the southeast are old volcanoes, some of which still show signs of activity. Pyramid Peak, in the Reindeer Hills area at the western end of the Denali Highway, was also formed by volcanic action and is thought to be the remainder of a large, ancient volcano.



FIG. 17

THE MOUNTAIN BUILDING PROCESSES

Turnout Number 5 - Maclaren River and Pingos. This turnout is located at milepost 37.0 at an elevation of approximately 3800 ft. It is located at an existing gravel based turnout.

It offers views of the Maclaren River, Maclaren Glacier, the Maclaren Valley and the Alaska Range. The wet valley has a number of pingos (frost boils), some of which have collapsed causing small, odd shaped lakes.

The vegetation is alpine tundra on the east side of the roadway and low brush on the west. The two ecosystems apparent at this location are greatly affected by aspect.

Cost of developing this site will be minimal. The parking area needs grading, trash should be removed and interpretation, entry and premonitory signs set in place.

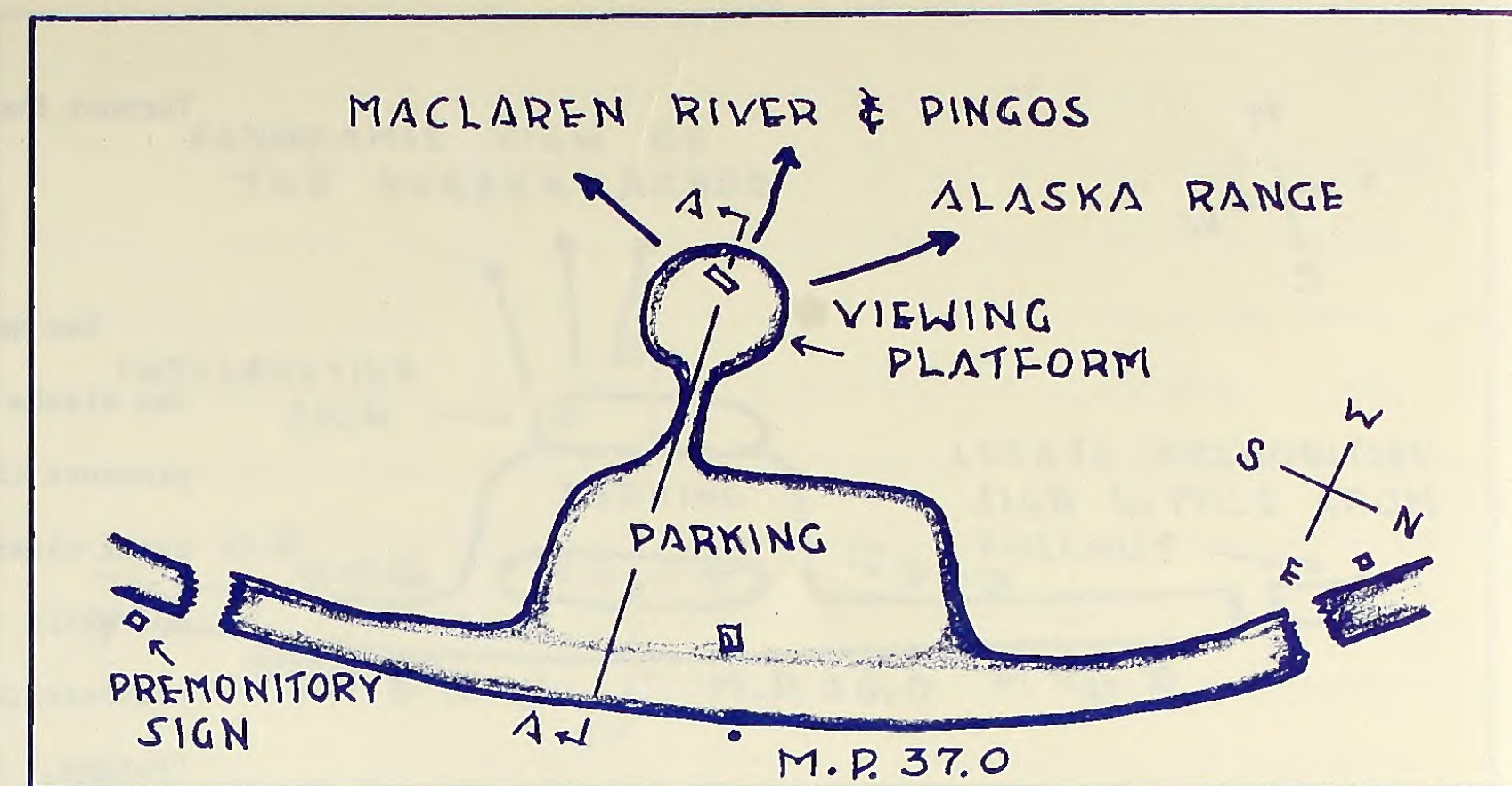


FIG. 18

SITE PLAN FOR PULLOUT NO. 5

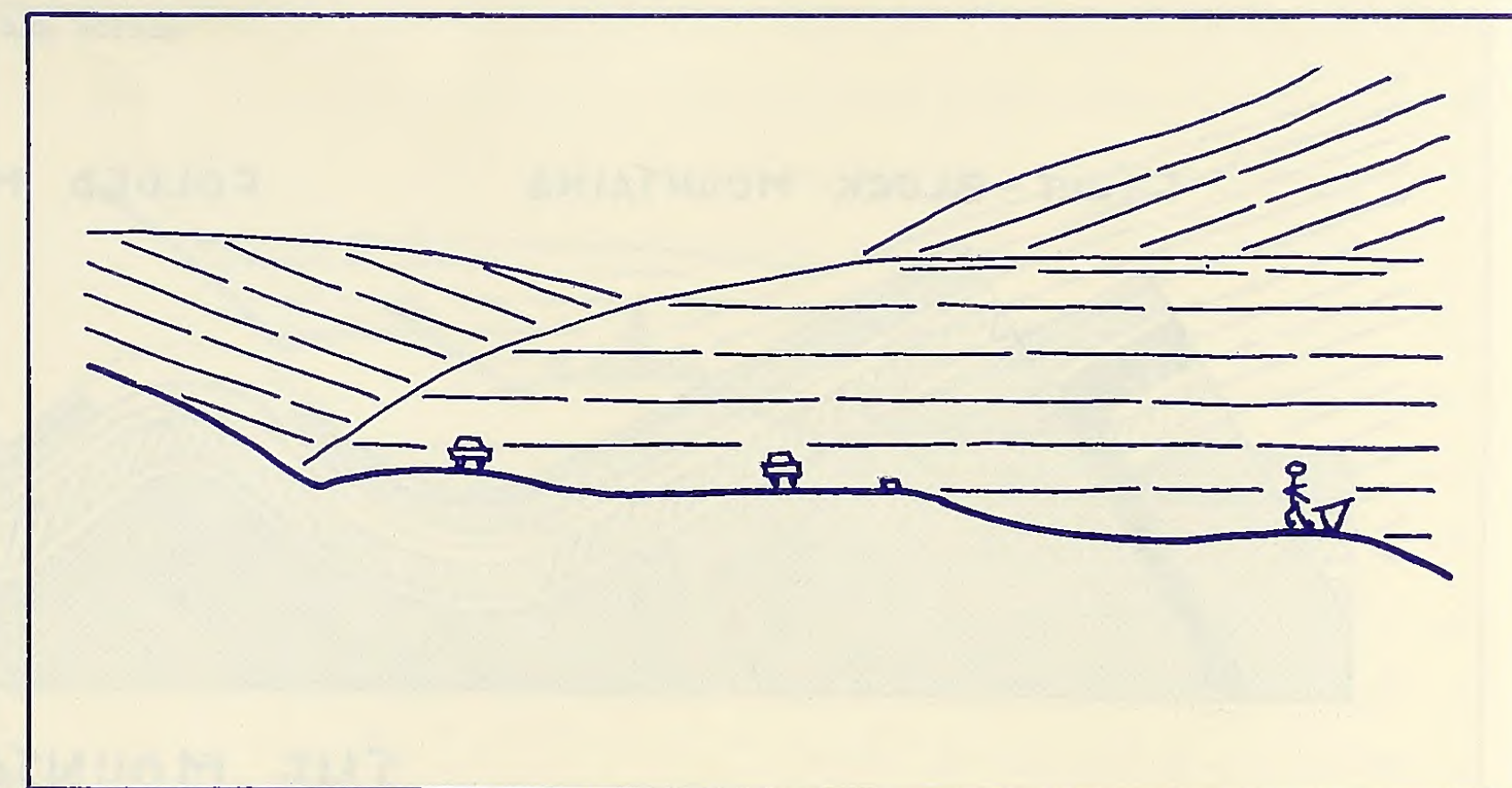


FIG. 19

SECTION AA

Turnout 5 - Maclaren River Viewpoint, M.P. 37.0

This site was selected for its view of the Maclaren River to interpret both ptarmigan, which are common in this area, and the two vegetative ecosystems visible from this point.

An illustration has not been presented, but graphics depicting the three types of ptarmigan - willow, rock, and white tail are recommended for the sign plate. Recommended interpretative wording is presented here.

The Maclaren River

The primary source of the Maclaren River is the Maclaren Glacier which flows from the south slopes of the Alaska Range. The river, glacier and Alaska Range can all be seen from this point. The Maclaren joins the Susitna River south of the highway and together they flow into Cook Inlet, west of Anchorage.

This area features two vegetative systems. Low brush vegetation occurs west of the highway, while Alpine tundra is on the right. The Alpine tundra system is composed of barren rock with low growing lichens, grasses, mosses and sedge. Tundra is extremely fragile and regrowth is slow; some lichens may require 60 years to recover from over-use or destruction. Alpine tundra provides good habitat for Dall sheep, grizzly bear, caribou and ptarmigan.

The ptarmigan, pictured here, is a hearty game bird that inhabits tundra area. The willow, rock and white tailed ptarmigan may live in the same area, but at different altitudes. Willow ptarmigan live nearest to the line, rock ptarmigan inhabit the middle slopes, while white tails are found on the high ridges close to glaciers and snowfields.

Turnout Number 6 - Geologic Point of Interest. Pullout Number 6 is located at milepost 40.8 at an elevation of approximately 2950 ft. There is no turnout existing at this location and construction would be required.

This stop offers a close view of a partially collapsed pingo. The small pond attracts some small water birds that add interest to the area.

The vegetation is wet tundra and it is quite marshy at this location.

The parking area would require transporting gravel to the site and construction of the parking. Additional expenses would be incurred in purchase and installation of the following signs: interpretation, entry and two premonitory.

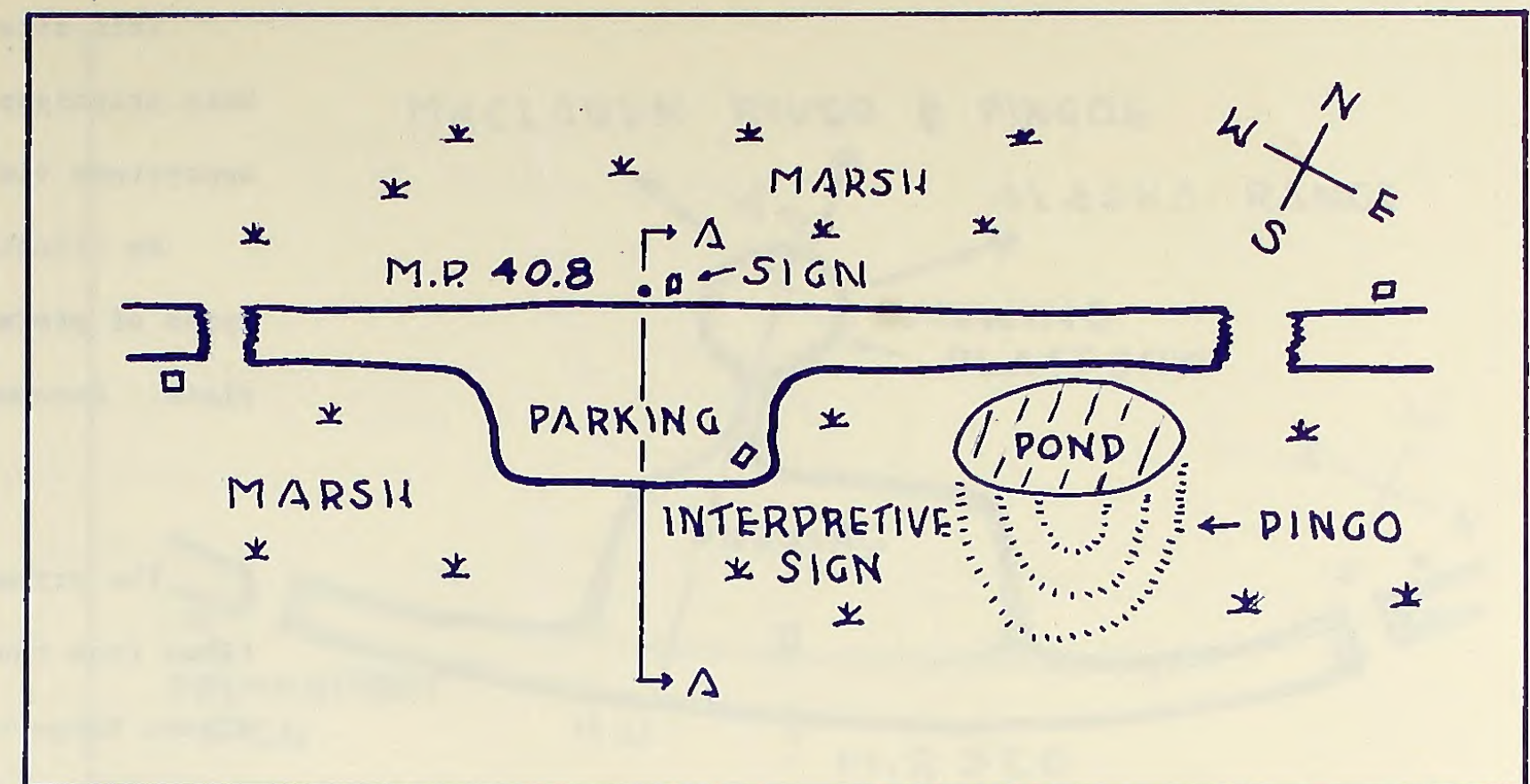


FIG. 20

SITE PLAN FOR PULLOUT NO. 6

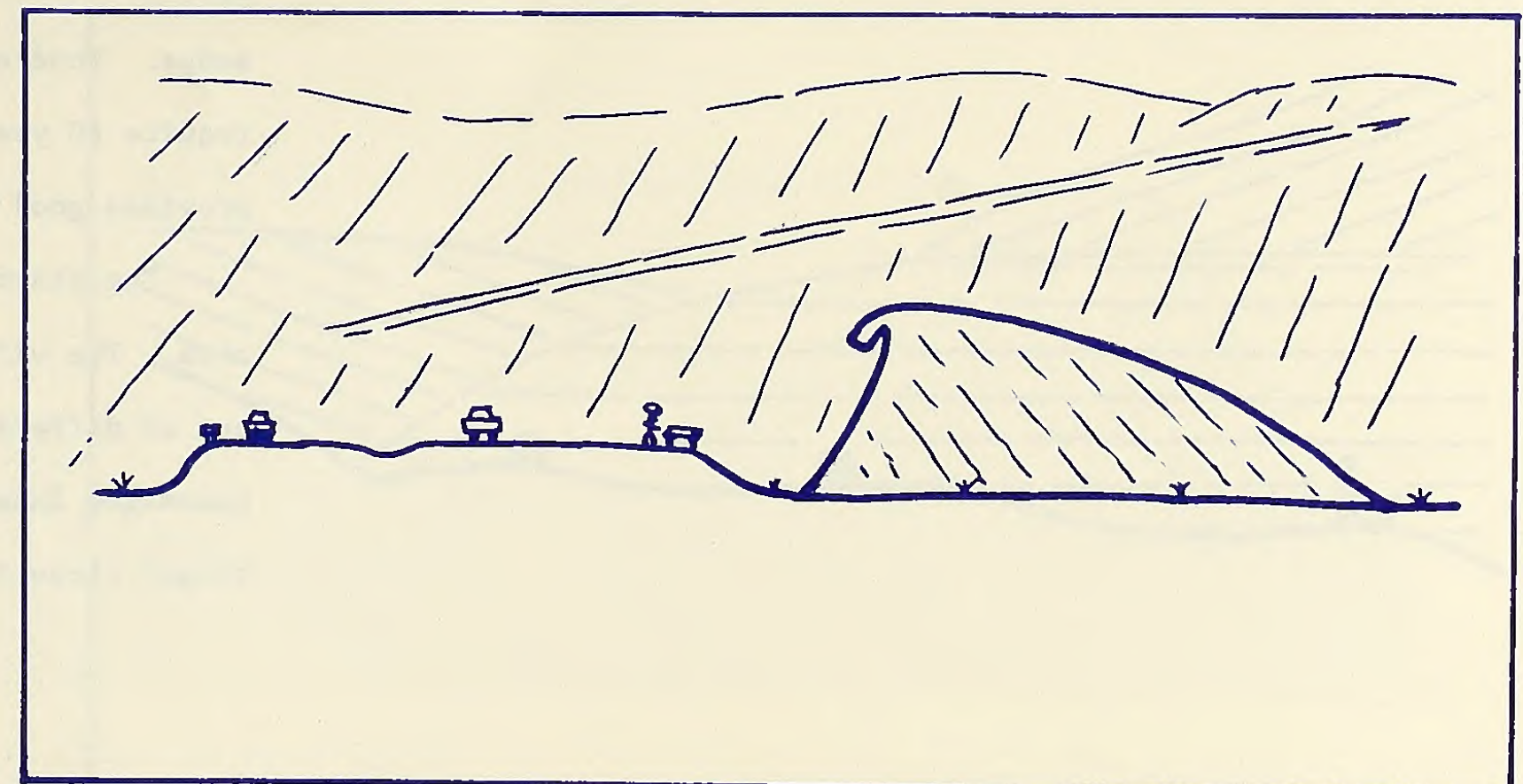


FIG. 21

SECTION AA

The Pingo

Pingos are a type of frost boil caused by subsurface moisture welling up through an opening in a permafrost layer. The moisture collects and freezes year after year until the overlying mat of thick vegetation is pushed upward into the characteristic mound shape. The pingo eventually tears around the edges. These torn edges fill with water during the warmer months to form the ponds often found around pingos. These ponds are important waterfowl habitat areas.

The pingo here has partially fallen away, perhaps from melting of the frost boil.

Turnout 6 - Geologic Point of Interest, M.P. 40.8

This site was chosen because it offers a closeup observation point of a geologic phenomenon known as a "Pingo." A pingo is actually a type of frost boil caused by subsurface moisture welling up through an opening in the permafrost and pushing the accumulated mat of vegetative growth upward into the characteristic mound shape. A description of this process with an illustration would make an interesting interpretive story.

Recommended interpretive sign wording and illustration are presented here:

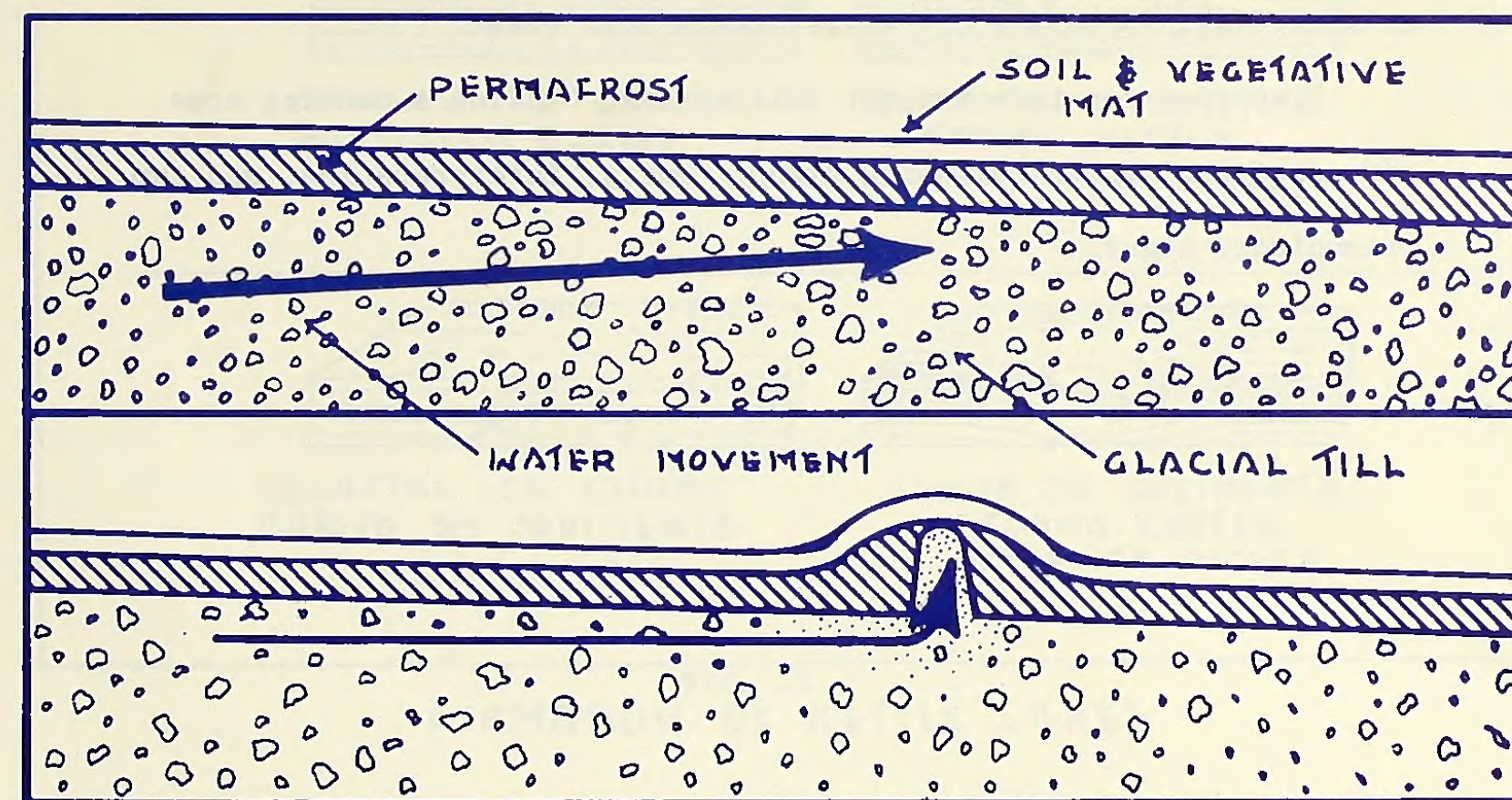


FIG. 22

FORMATION OF A PINGO

Turnout Number 7 - Geologic Point of Interest. This pullout is located at milepost 41.3 at an elevation of approximately 3000 ft.

Vegetation is classified wet tundra, however this location is on a moraine and the vegetation in the immediate vicinity is low brush.

This stop offers a good view of kettle lakes that occur high up on a moraine. Some are dry while others hold water.

Preparing for this turnout will require blading a parking area and constructing the following signs: entry, interpretation, and two premonitory signs.

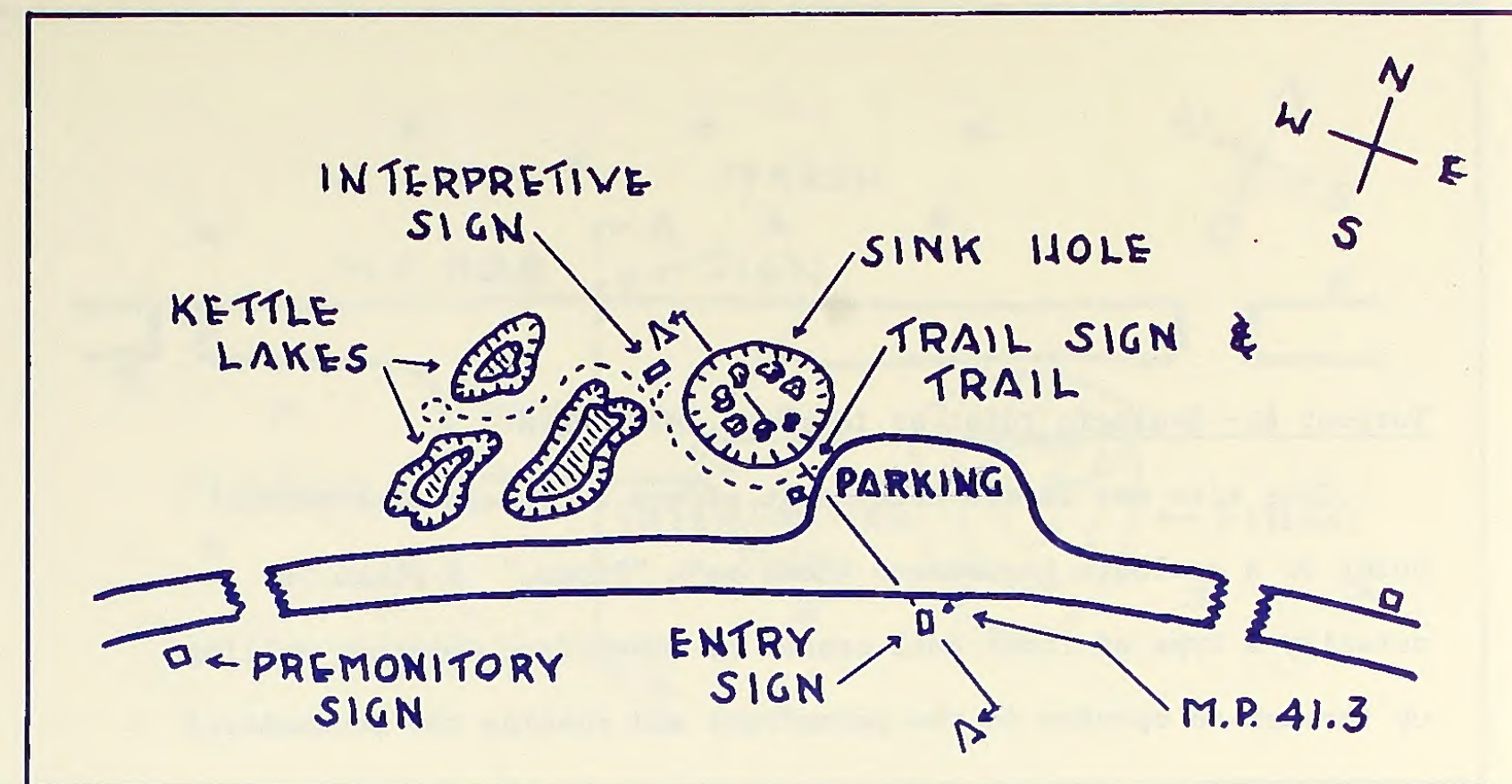


FIG. 23

SITE PLAN FOR PULLOUT NO. 7

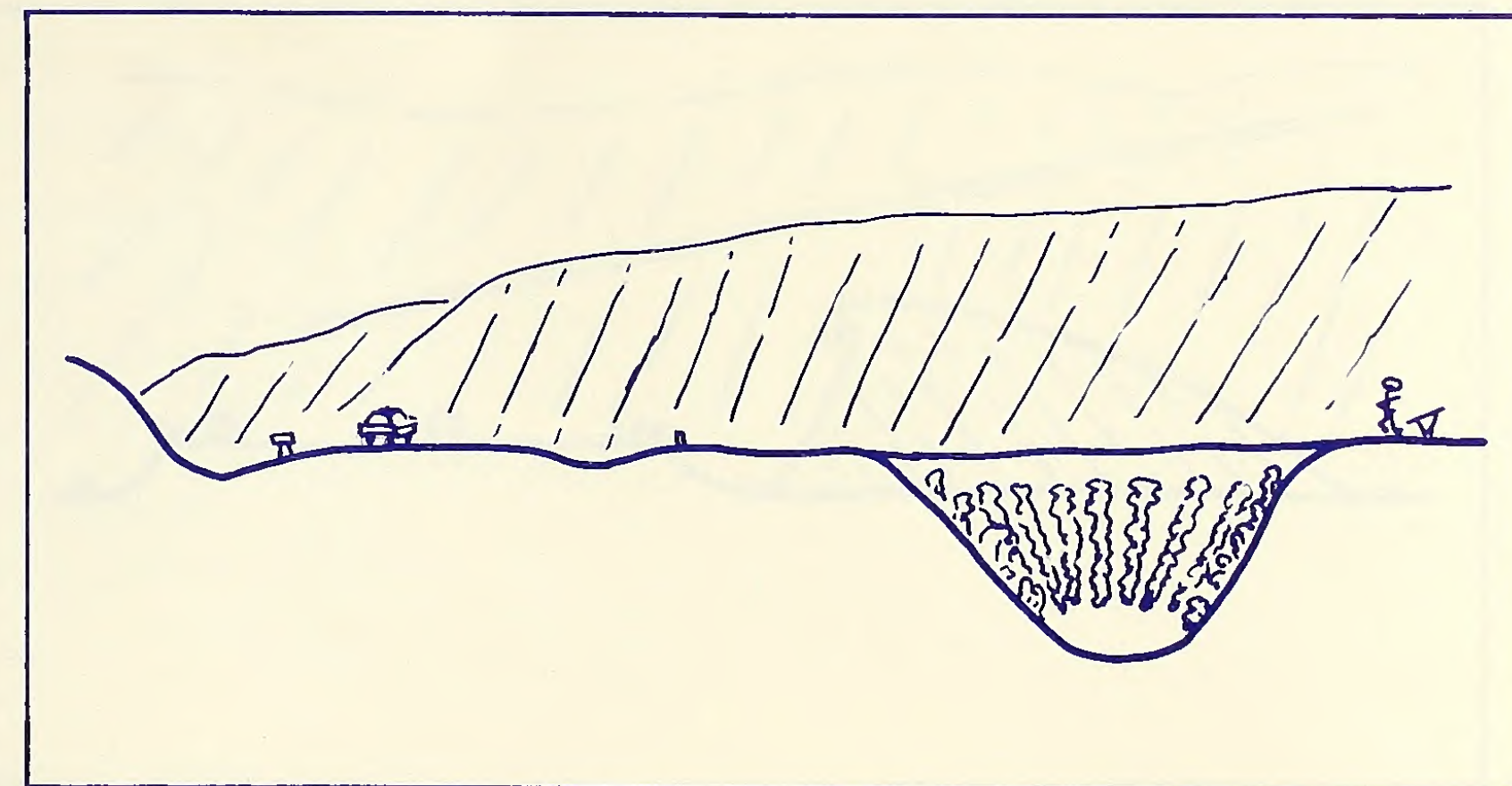


FIG. 24

SECTION A A

Turnout 7 - Geologic Point of Interest, M.P. 41.3

This site was selected to interpret the glacially formed kettle lakes that occur here. Kettle lakes are common along the Denali Highway. An explanation of their origin should be interesting to the visitor.

Recommended sign wording and illustrations are presented on this page.

Kettle Lakes

The several small lakes seen from this point are called "kettle" lakes. They were formed by the large glaciers that once covered this area between 10,000 and 20,000 years ago. When the glaciers began to melt back, or retreat, the ice at the edge was thinnest and often broke off in chunks of different sizes. As the ice retreated further, these chunks became separated from the main body and were either partially or entirely buried by the sediments that washed from the melting glacier. These chunks of ice gradually melted and the sediments that covered or surrounded them slumped into a bowl shape to form depressions or kettles. The kettles became natural basins for lakes like the ones you see here. Most kettle lakes are somewhat circular in shape because that is the shape any mass of ice separated from a glacier will tend to assume as it melts.

Dry kettles are dry because they are situated above the water table and are composed of materials so porous that they will not hold water.

Vegetative patterns in the dry kettle are produced as vegetation becomes established and holds the surface. Other plants then become established directly below those growing, creating the row effect. Watch for similar growth patterns on hillsides along the highway.

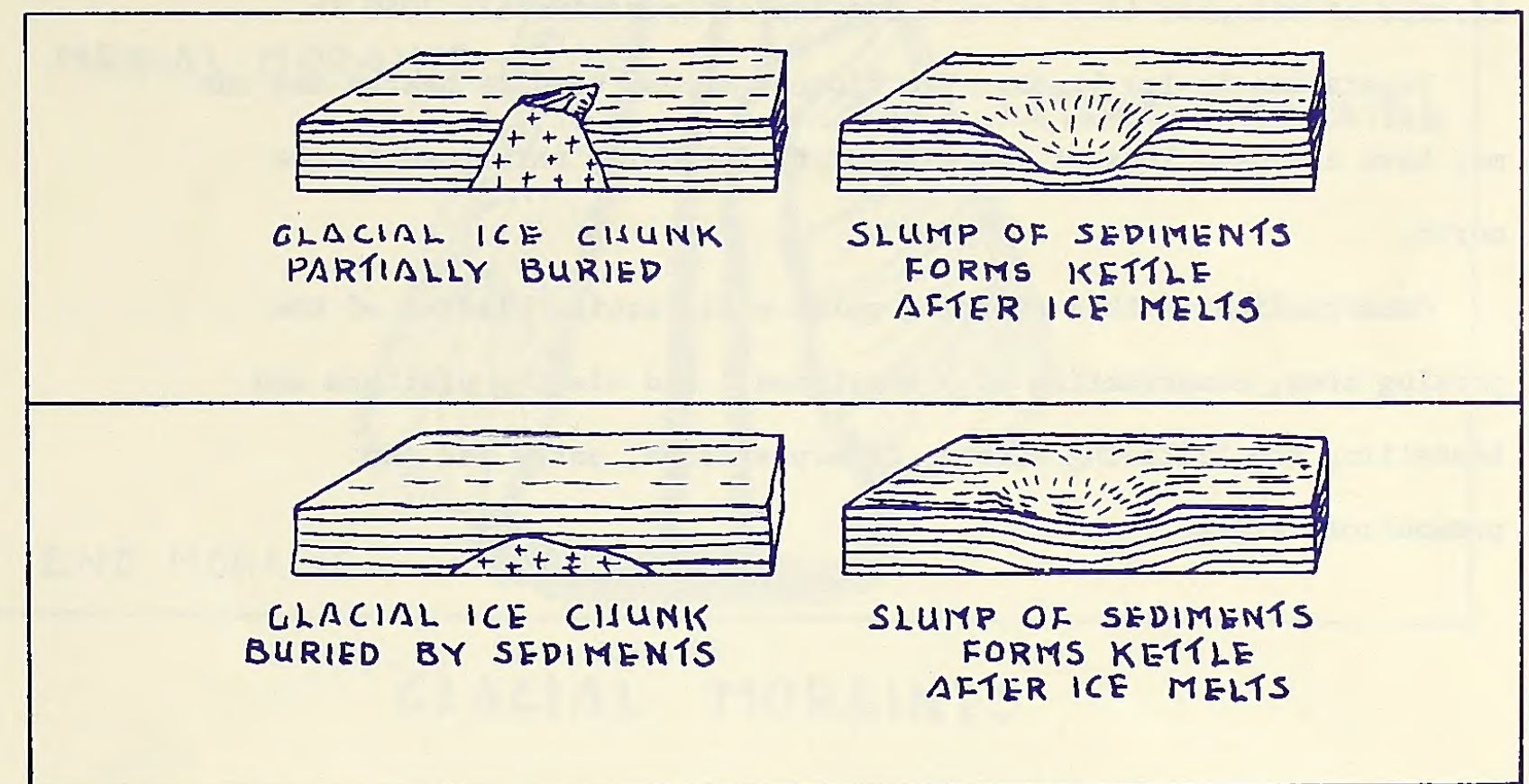


FIG. 25
FORMATION OF KETTLE LAKES

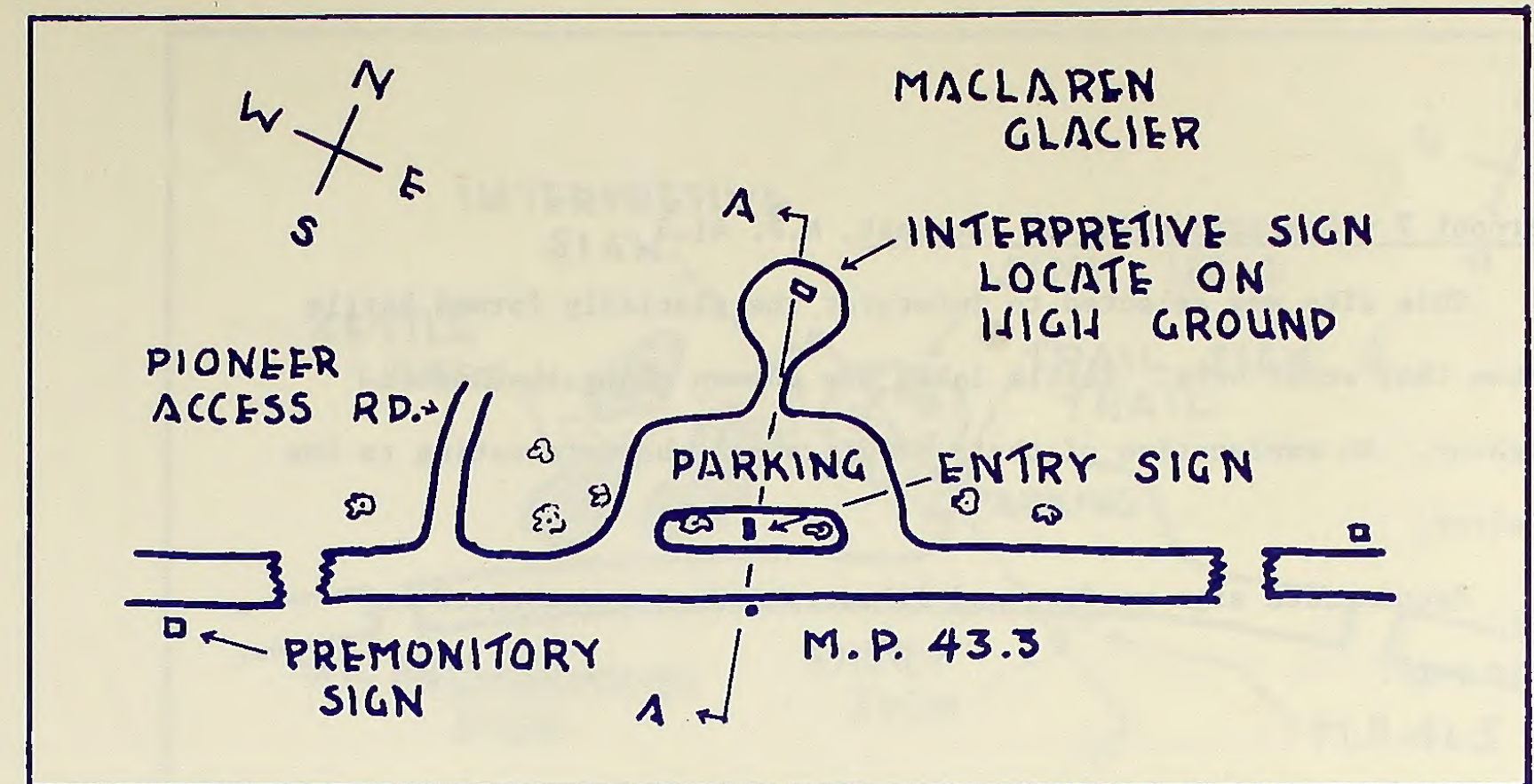


FIG. 26

SITE PLAN FOR PULLOUT NO. 8

Turnout Number 8 - Maclaren Glacier Viewpoint. This pullout is located at milepost 43.3 at an elevation of approximately 3050 ft.

Vegetation is low brush. The Pioneer access road is nearby and one may have a closer look at the glacier by following this road to the north.

Construction of this stopping point will require blading of the parking area, construction of a short trail and viewing platform and installing the following signs: interpretation, entry and two premonitory signs.

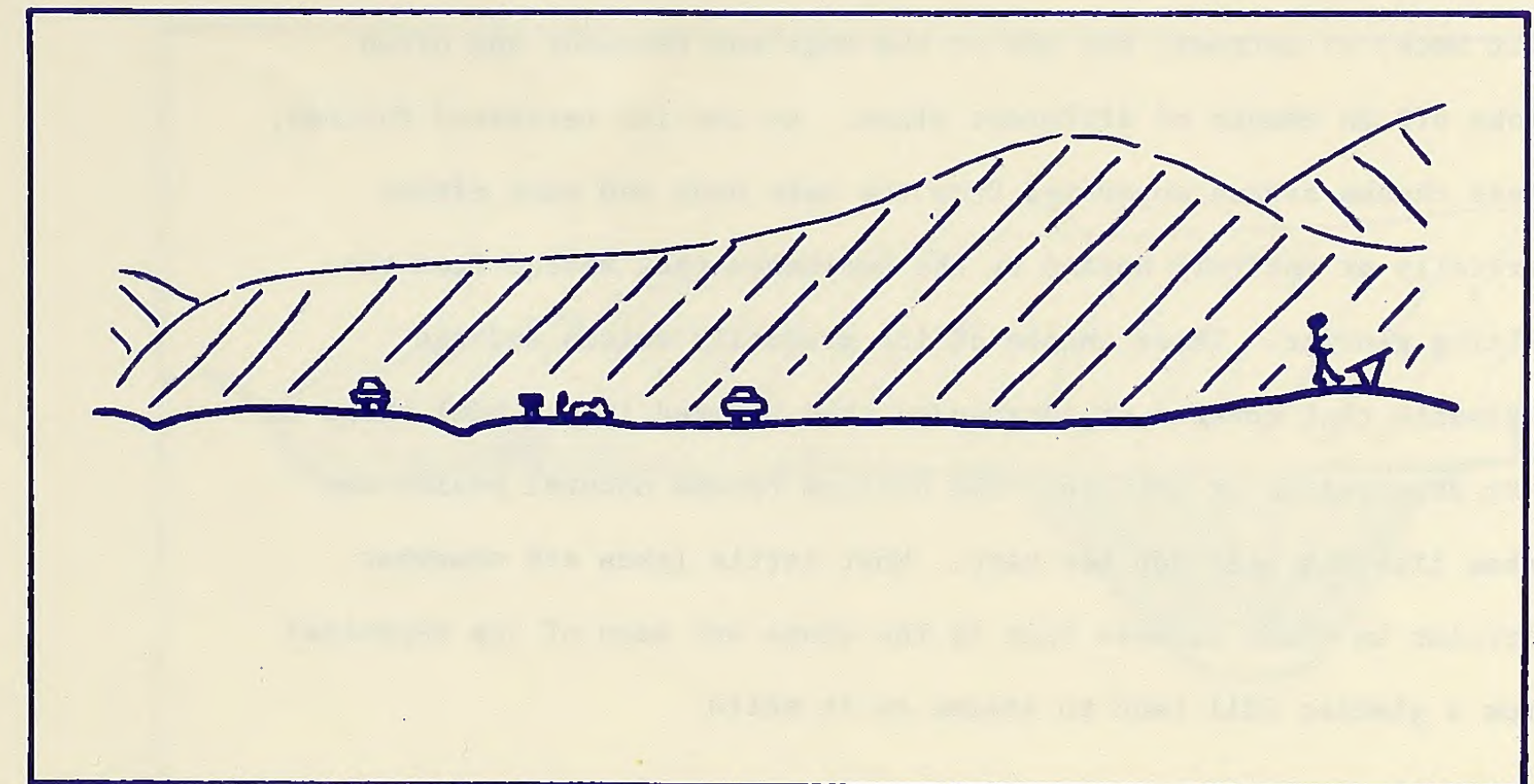


FIG. 27

SECTION AA

Turnout 8 - Maclaren Glacier Viewpoint, M.P. 43.3

This site was selected to interpret glaciers because of its excellent view of the Maclaren Glacier.

Recommended interpretive wording and sign illustration are presented here:

Glaciers

The Maclaren Glacier seen from this point is 16 miles distant.

Glaciers form in areas where average annual snowfall exceeds snowmelt. As the snow accumulates, the weight of the upper layers compresses the bottom layers to form ice. The accumulated ice has tremendous weight which causes it to move or "flow." The rate of ice movement is determined by such factors as; size and weight of the glacier, degree of slope down which the glacier is moving; and relative resistance to movement of the surface over which the glacier moves. As glaciers move they pick up rock material from silt sized particles to huge boulders. This rubble accumulates on the ice surface as moraines. A lateral moraine is rock debris that has collected along the edges of the ice, while a medial moraine occurs toward the center of the glacier, and is usually formed by the joining of lateral moraines of two or more glaciers that have merged. Moraines also develop at the end of the ice sheet and are called end moraines. A series of end moraines deposited while the glacier is melting back, or receding, are called recessional moraines. A terminal moraine is one which marks the farthest advance of the glacier.

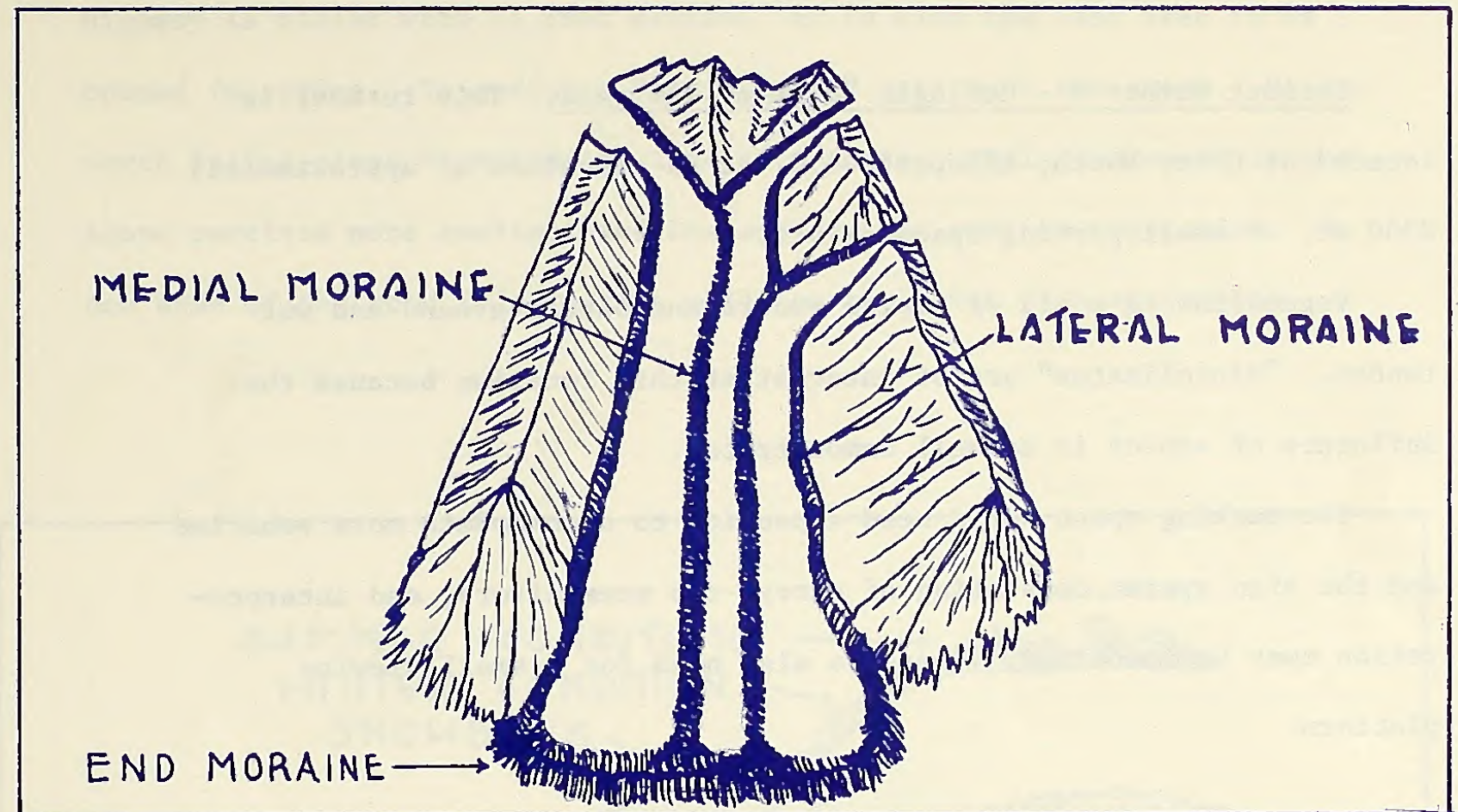


FIG. 28

GLACIAL MORAINES

Turnout Number 9 - Geologic Point of Interest. This turnout is located at Crazy Notch, milepost 46.0, at an elevation of approximately 3300 ft. A small parking space exists.

Vegetation is a mix of alpine tundra and barren ground and wet tundra. "Miniclimates" are of interest at this location because the influence of aspect is so well demonstrated.

The parking space would need expansion to accommodate more vehicles and the sign system consisting of entry, two premonitory, and interpretation must be installed. There is also need for a small viewing platform.

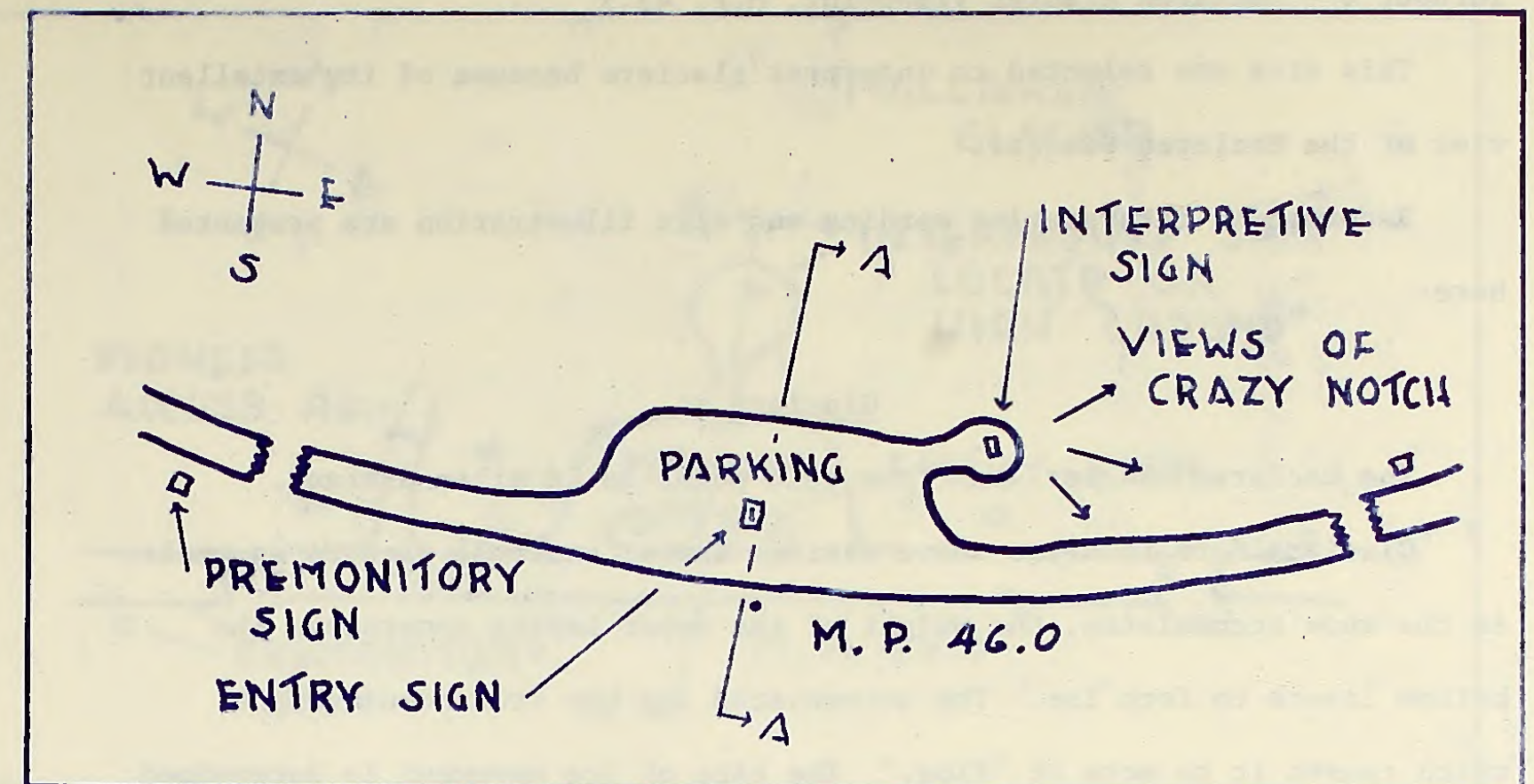


FIG. 29

SITE PLAN FOR PULLOUT NO. 9

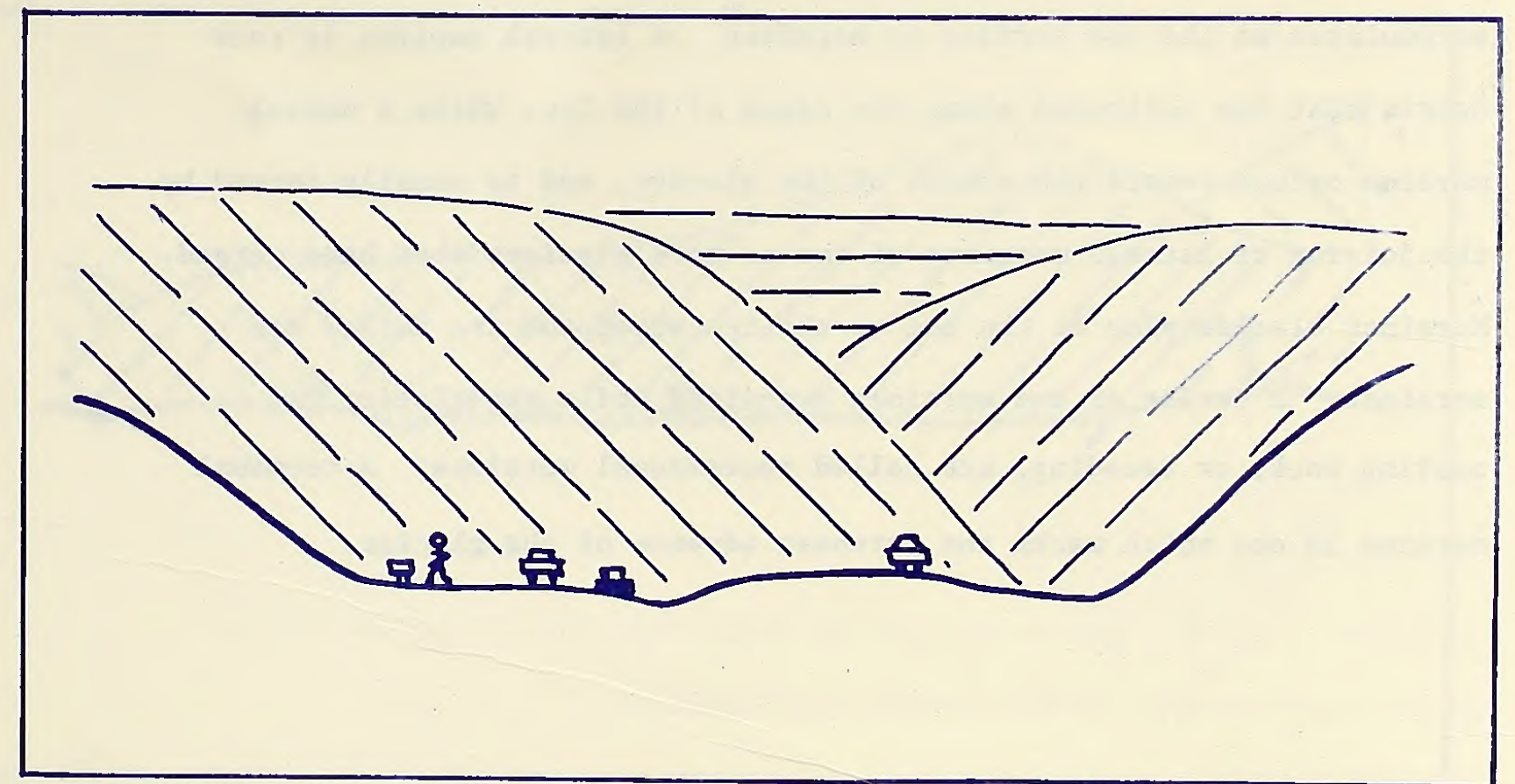


FIG. 30

SECTION AA

Turnout 9 - Geologic Point of Interest, M.P. 46.0

This site was selected to interpret the "Crazy Notch" that is present here. The reason for the name Crazy Notch is not known, but the geologic processes involved in the formation of the notch are interesting. Miniclimates will also be interpreted.

The recommended interpretive wording and illustration are presented here:

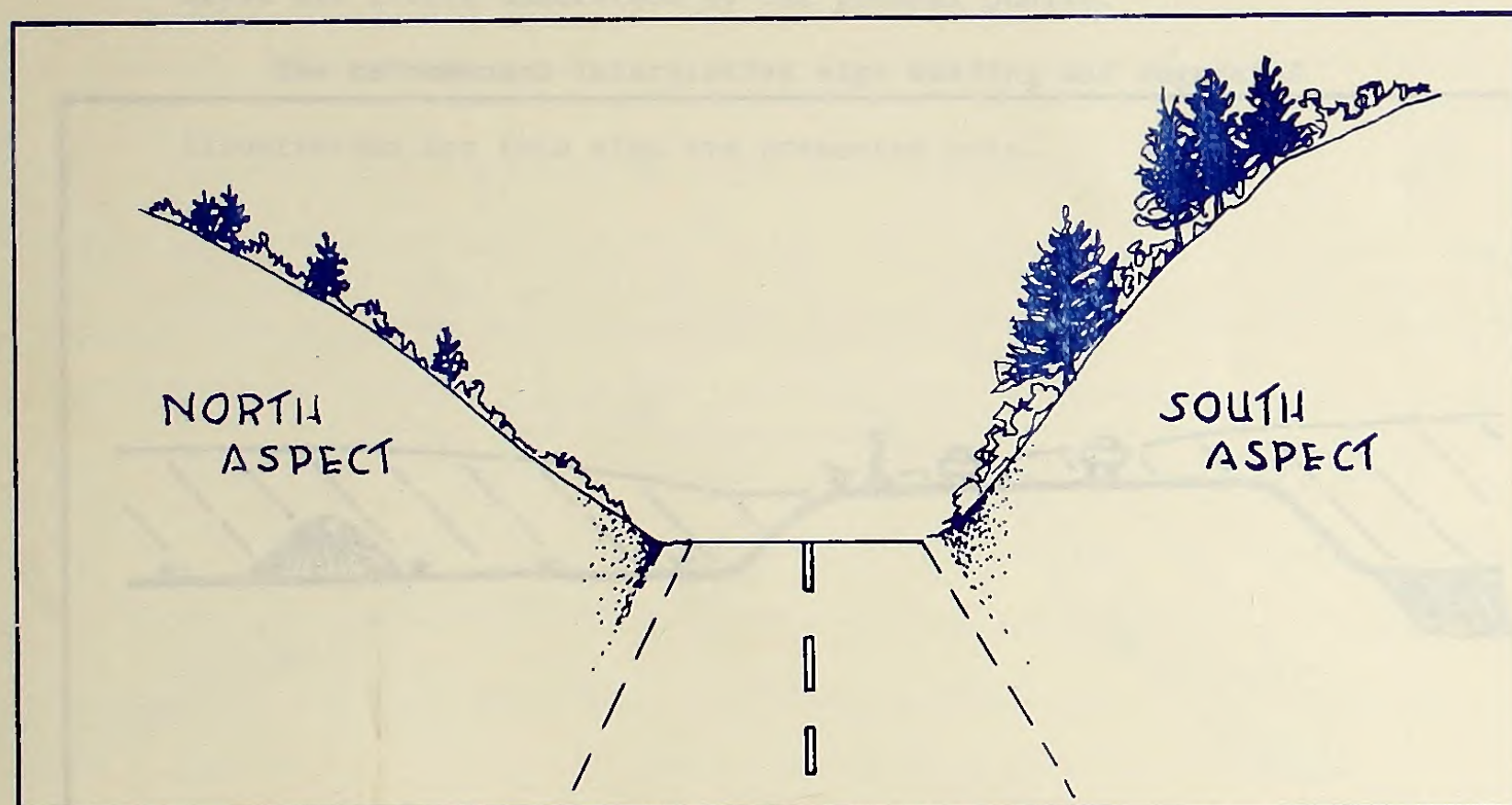


FIG. 31

EFFECT OF ASPECT UPON VEGETATIVE GROWTH

Crazy Notch

The "Crazy Notch" is a result of the actions of ice and water. The notch was cut through a lateral moraine of the Maclaren Glacier system by a glacial stream that existed after the moraine had been deposited. A lateral moraine is a buildup of glacially carried rock material along the sides of a glacier.

The notch acts as a natural snow catchment, closing the Denali Highway in winter with 15 foot drifts. It is also the last area to be opened in spring. In spring a "miniclimature" exists at the notch. On the north facing slope snow remains late into spring, while the south facing slope receives more sunlight and has spring thaw and new vegetation. On one side of the road it's winter, while on the other it's springtime.

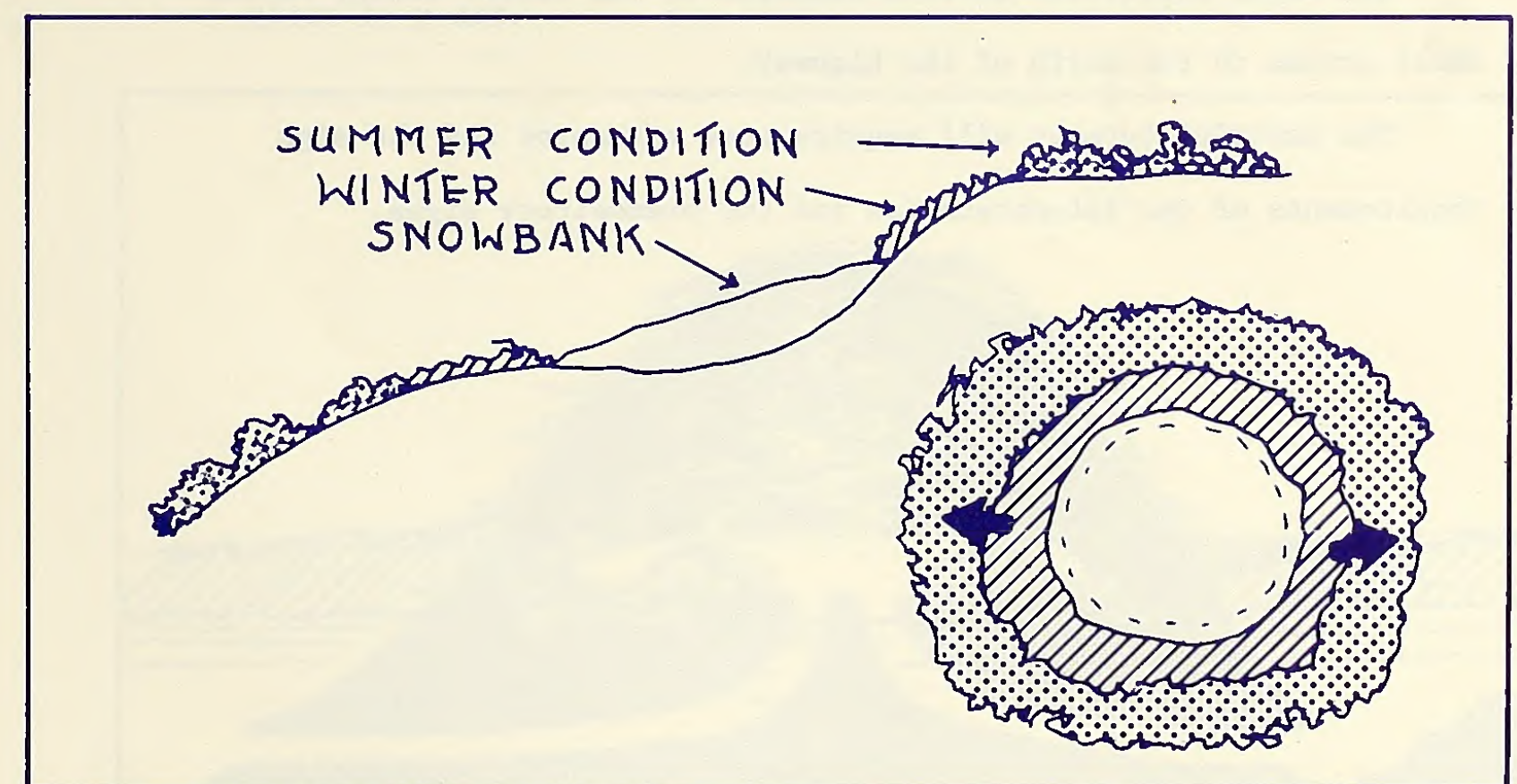


FIG. 32

SUMMER MINICLIMATES

Turnout Number 10 - Wildlife Point of Interest. This pullout is located at an existing turnout at milepost 48.4 at an elevation of approximately 3150 ft. It is located at an existing turnout.

Vegetation is wet tundra but the location is surrounded by sparse low vegetation and barren ground.

The major attraction at this location is the beaver colony on the small stream to the north of the highway.

The existing turnout will require some expansion and the sign requirements of one interpretation and two premonitory signs.

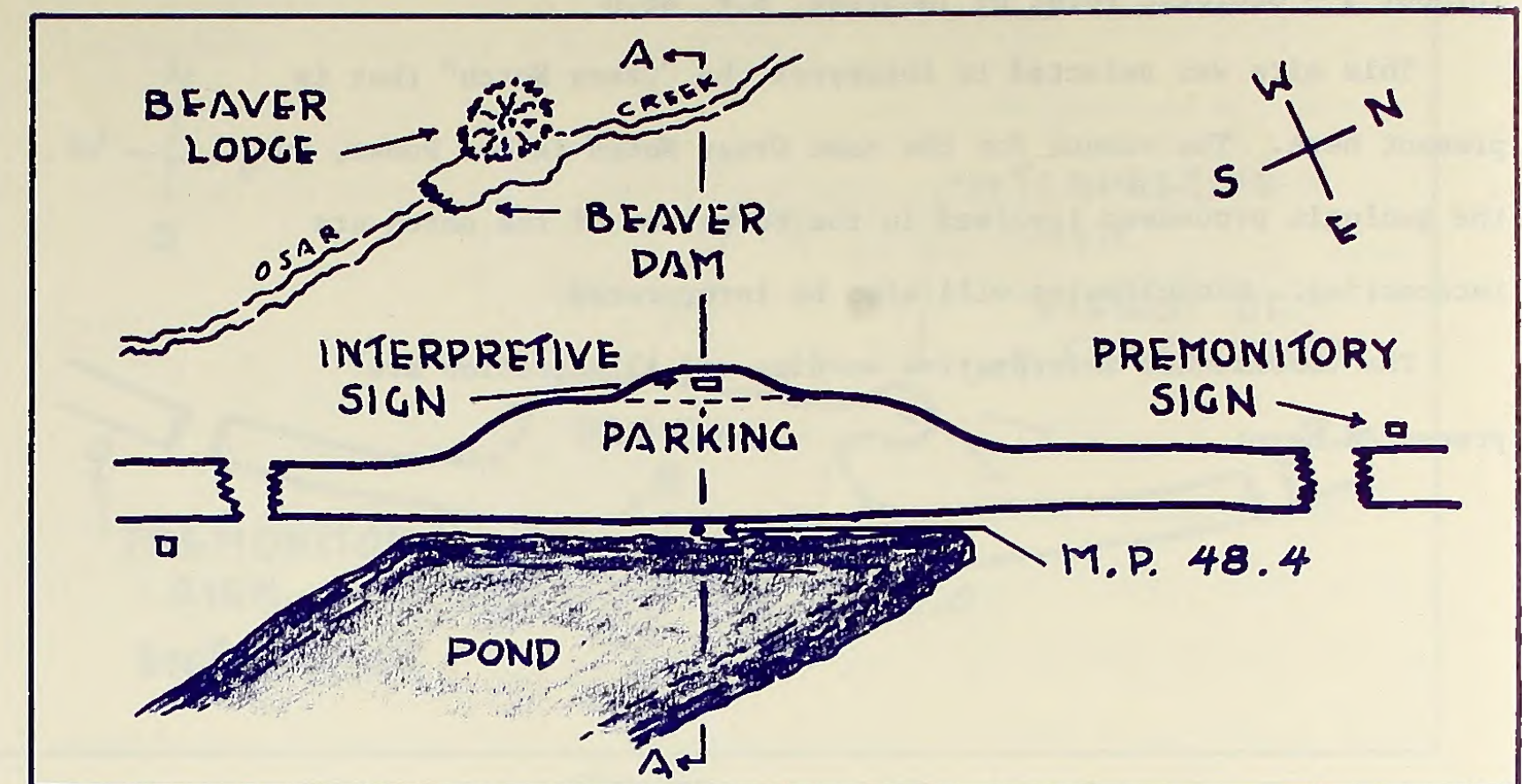


FIG. 33

SITE PLAN FOR PULLOUT NO. 10

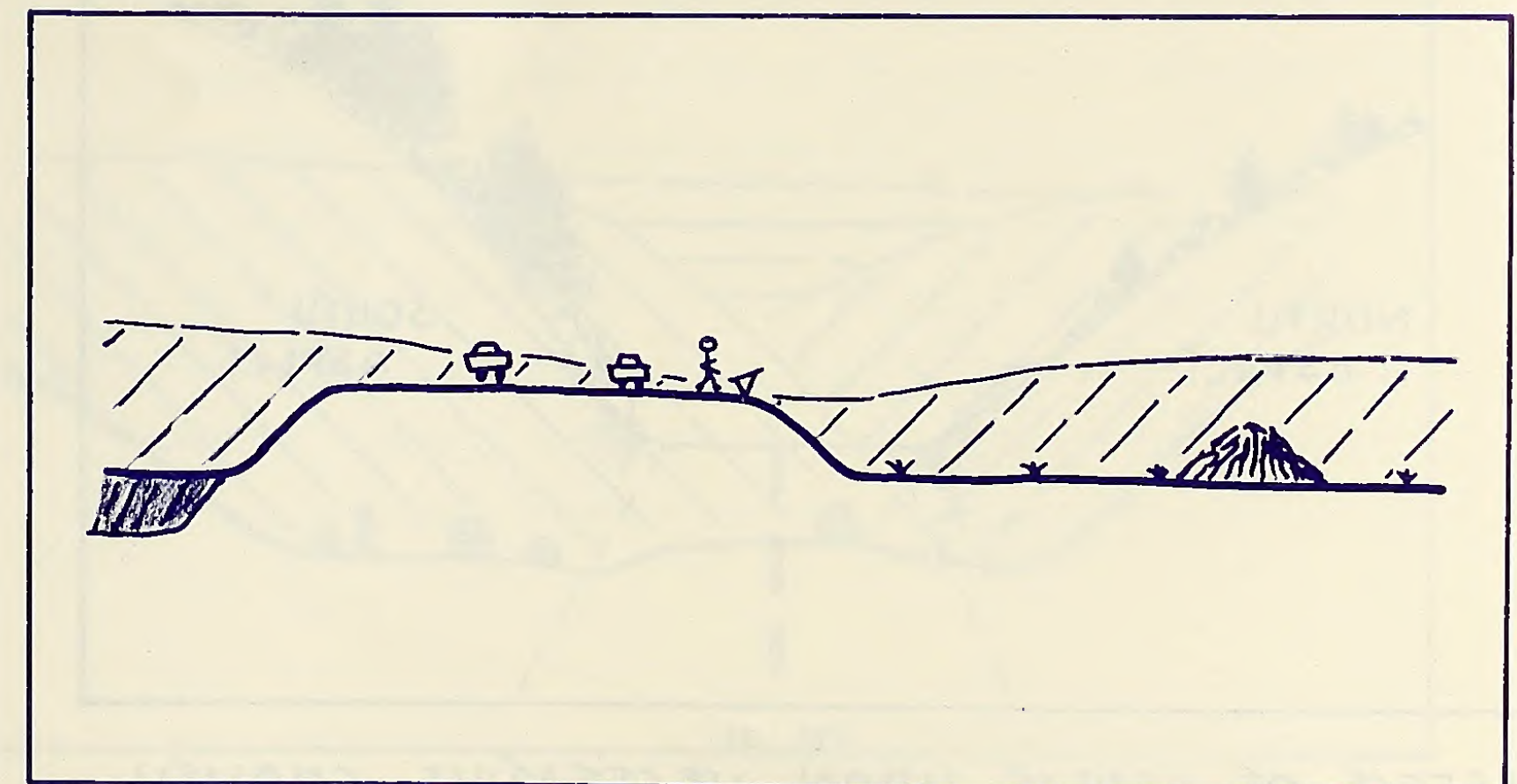


FIG. 34

SECTION AA

The Beaver

Beavers are large water-dwelling rodents, famed for their ability to build dams. The beaver dam before you has been constructed across Osar Creek, forming a pond in which the beaver lives and works. Beaver dams are built of tree branches, held together with mud and stones. The stick covered mound behind the dam is a beaver lodge. Built of sticks, mud and stone, lodges contain a large, dry room situated above water level. A tunnel leads from this room that opens outside the lodge beneath the surface of the water. These underwater doorways help protect the beaver from its enemies.

In winter, the beaver eats the bark from piles of twigs stored underwater during the previous summer and fall. Preferred food is the bark of willow alder, birch, aspen and poplar. Summer food consists of pond vegetation and roots. Canals are sometimes constructed to transport food and building supplies to the pond. Beavers mate for life and live for about 16 years.

Turnout 10 - Wildlife Point of Interest, M.P. 48.4

This pullout was selected to interpret the beaver, its lodge, and dam present in Osar Creek north of the highway. The beaver and its constructions were chosen for interpretation because the lodge and dam are readily visible from the highway and are active. It is felt that such interpretation would be of interest because the beaver is a familiar animal to the public, yet its habits and life-style are little understood by the general public.

The recommended interpretive sign wording and suggested illustration for this sign are presented here.



FIG. 35

CROSS SECTION OF BEAVER LODGE

Turnout Number 11 - Wildlife Point of Interest. This pullout is located at milepost number 49.5 at an elevation of approximately 3150 ft. A gravel turnout exists at this location.

Vegetation is wet tundra and low brush. The road is atop an esker with lakes along each side of the road. The lakes have an abundance of waterfowl and shore birds.

Cost of development of this area will be limited to installation of the necessary signs: entry, interpretive and two premonitory.

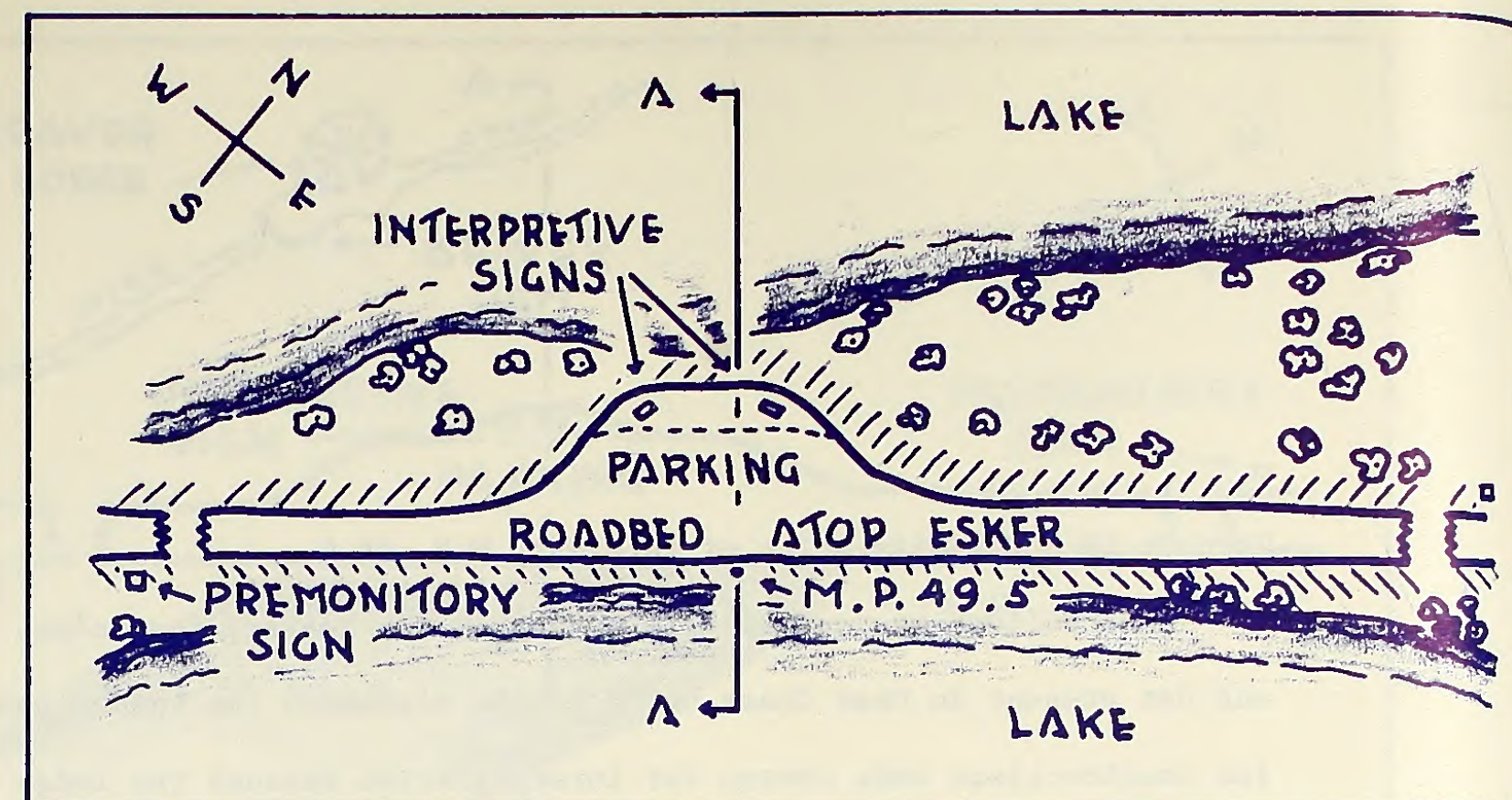


FIG. 36

SITE PLAN FOR PULLOUT NO. 11

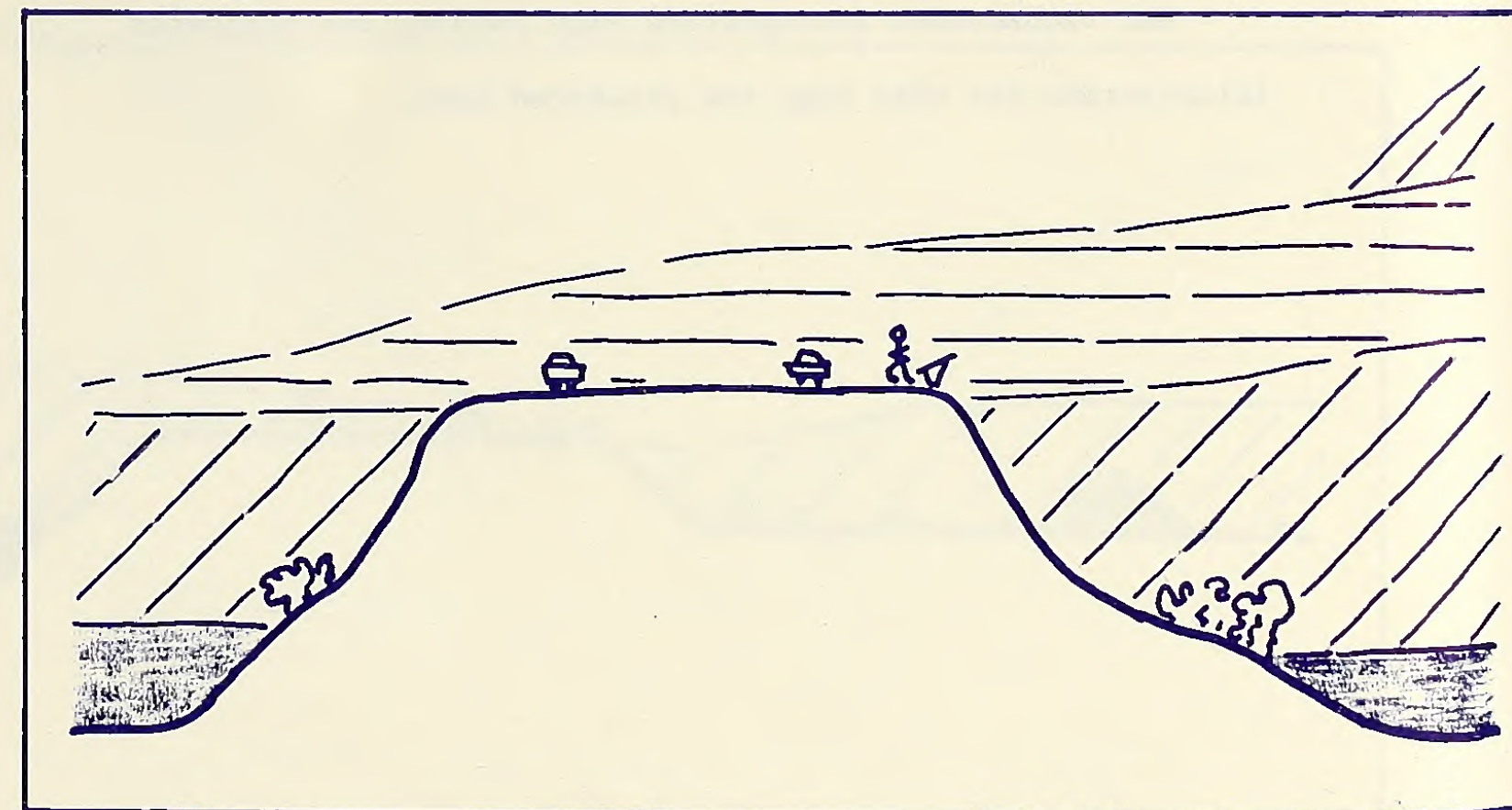


FIG. 37

SECTION A A

Turnout 11 - Wildlife Points of Interest, M.P. 49.5

This site was selected to describe some of the many species of waterfowl that inhabit the waters of the Denali area. The road is built on an esker at this point, offering an excellent view of the waterfowl and their habitat present in the small lakes on both sides of the road.

The recommended wording for this sign emphasizes trumpeter swans since they are rare and probably not familiar to many visitors. An illustration of a trumpeter swan is recommended for the interpretive sign face. A second interpretive sign at this pullout would enhance waterfowl interpretation and should include labeled illustrations of ducks, geese, grebes, loons and cranes.

The recommended interpretive wording appears below:

Waterfowl of the Denali Area

The ponds and lakes in the Denali Highway area provide excellent summer habitat for many species of migratory waterfowl. Diving and dabbling ducks, geese, grebes, loons, sandhill cranes and many shorebirds can be seen on the waters of the Denali area.

The rare trumpeter swan was not known to exist in Alaska and was first discovered in the Denali area in 1966. Trumpeters can best be identified by the call - a distinctive, short, low-pitched, resonant beep that can be heard at a distance. Trumpeters nest on old muskrat or beaver lodges or on a small island in a shallow pond or marshy lake. Nests are broad platforms of organic debris lined with down. Seven or eight dull white eggs are usually laid.

Trumpeters were once abundant in North America, but became almost extinct due to settlement of their breeding and wintering ranges. Today, thanks to proper wildlife management, the trumpeter swan is no longer in danger of extinction.

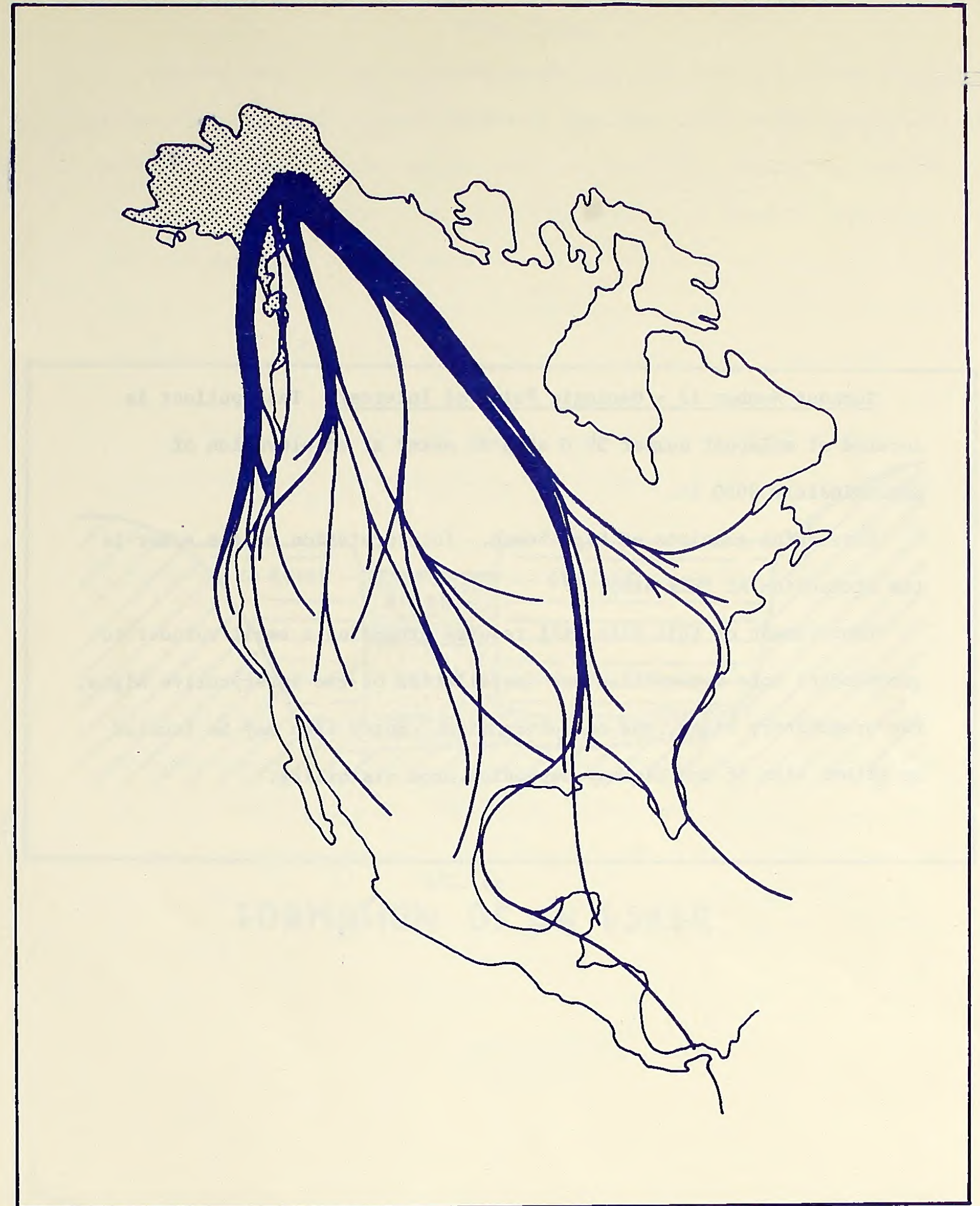


FIG. 38

WATERFOWL MIGRATIONS FROM INTERIOR ALASKA

Turnout Number 12 - Geologic Point of Interest. This pullout is located at milepost number 59.0 atop an esker at an elevation of approximately 3050 ft.

Vegetation consists of high brush. Interpretation of the esker is the attraction at this stop.

Improvement of this site will require expanding a small turnout to accommodate more automobiles and installation of two interpretive signs, two premonitory signs, and one entry sign. Entry sign may be located on either side of the highway depending upon visibility.

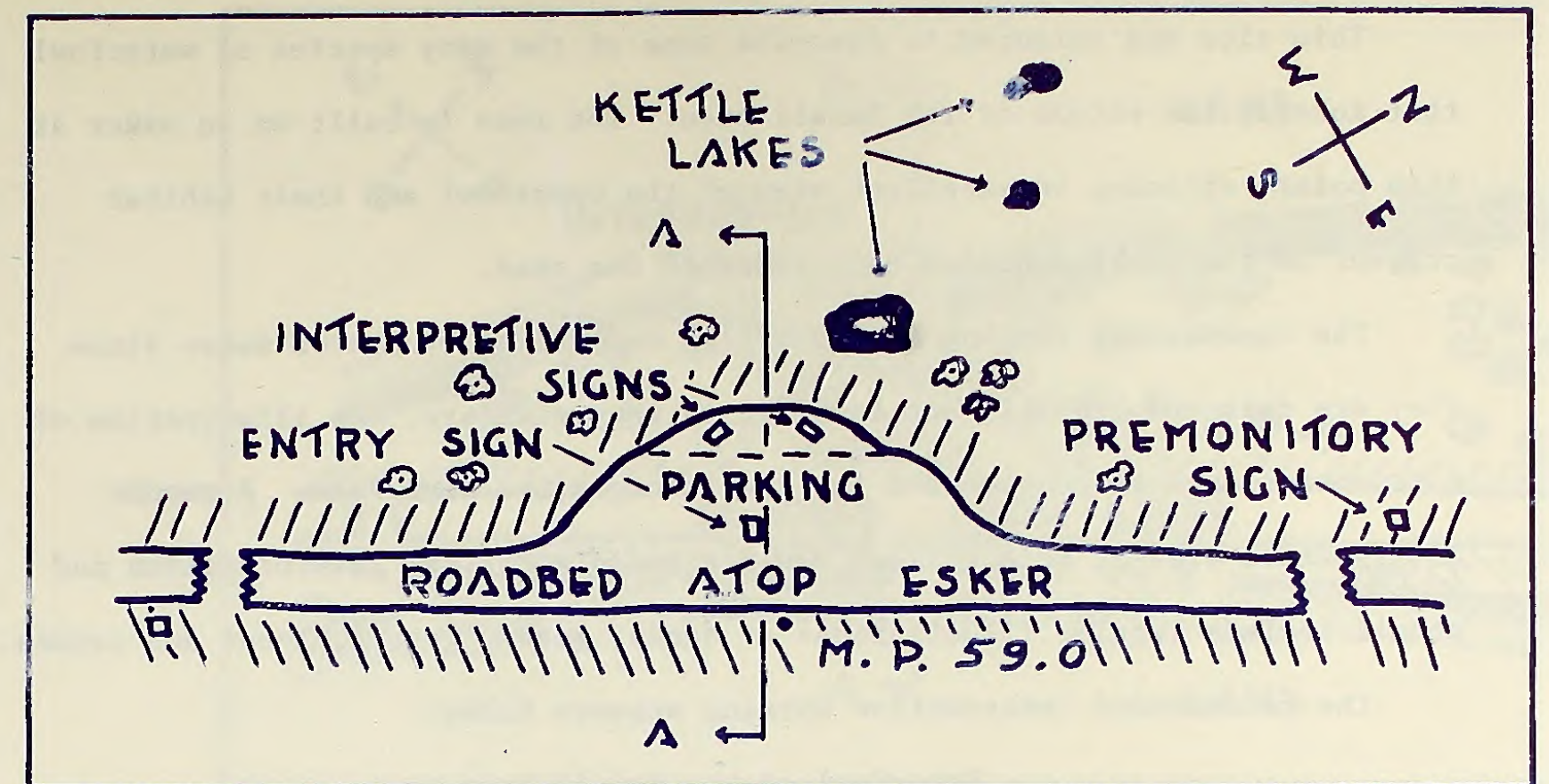


FIG. 39

SITE PLAN FOR PULLOUT NO. 12

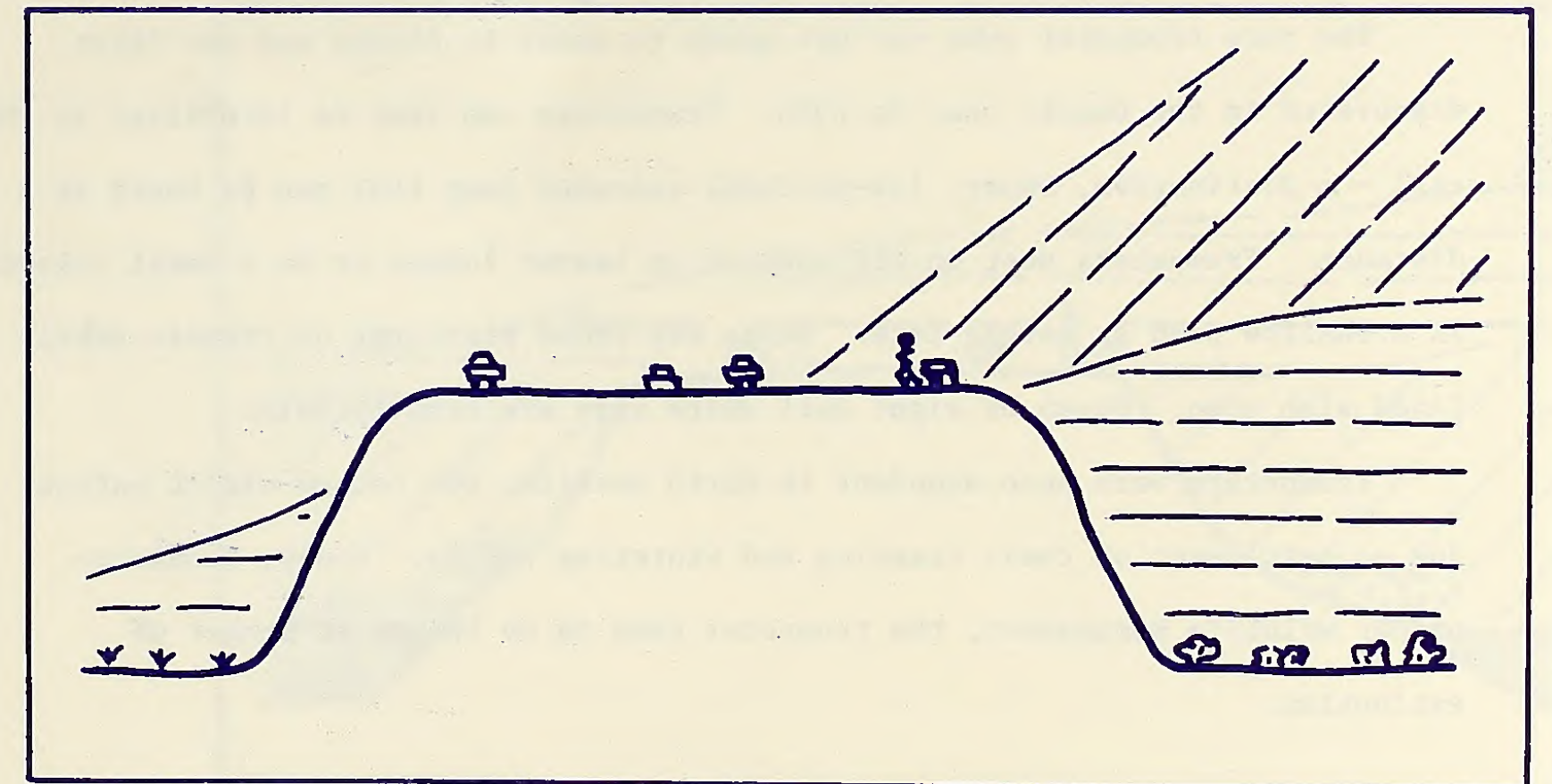


FIG. 40

SECTION A A

Turnout 12 - Geologic Point of Interest, M.P. 59.0

This pullout site was chosen because it represents an outstanding example of a glacially deposited feature known as an esker. The Denali Highway eskers warrant interpretation because unlike most eskers in the lower 48, they have not been removed for their sand and gravel deposits. They also are not overgrown by vegetation. They remain bare, intact, and obvious examples of a glacial feature that has been fast disappearing in most other states.

The recommended interpretive wording and illustrations appear on this page.

Eskers

You are standing on a glacial feature known as an esker. An esker is a sinuous ridge of silt, sand, gravel and cobbles that were carried and deposited by a stream that flowed within the glacier and were confined by walls of ice. When the glacier melted away these deposits were left as well-defined, elongated mounds.

Ancient man used eskers as convenient pathways across the area, just as modern man has used this esker as a natural roadbed for the Denali Highway. The highway traverses the esker for about a mile in each direction from this location. The steep, sloping sides of the roadway clearly define the path of the glacial stream that created the esker.

Eskers have gradually been disappearing in the lower 48 states due to their valuable deposits of sand and gravel. Those that remain may be so overgrown with trees and vegetation that they are not distinguishable as eskers. Denali area eskers, and this one in particular, are some of North America's outstanding examples of this type of glacial feature.

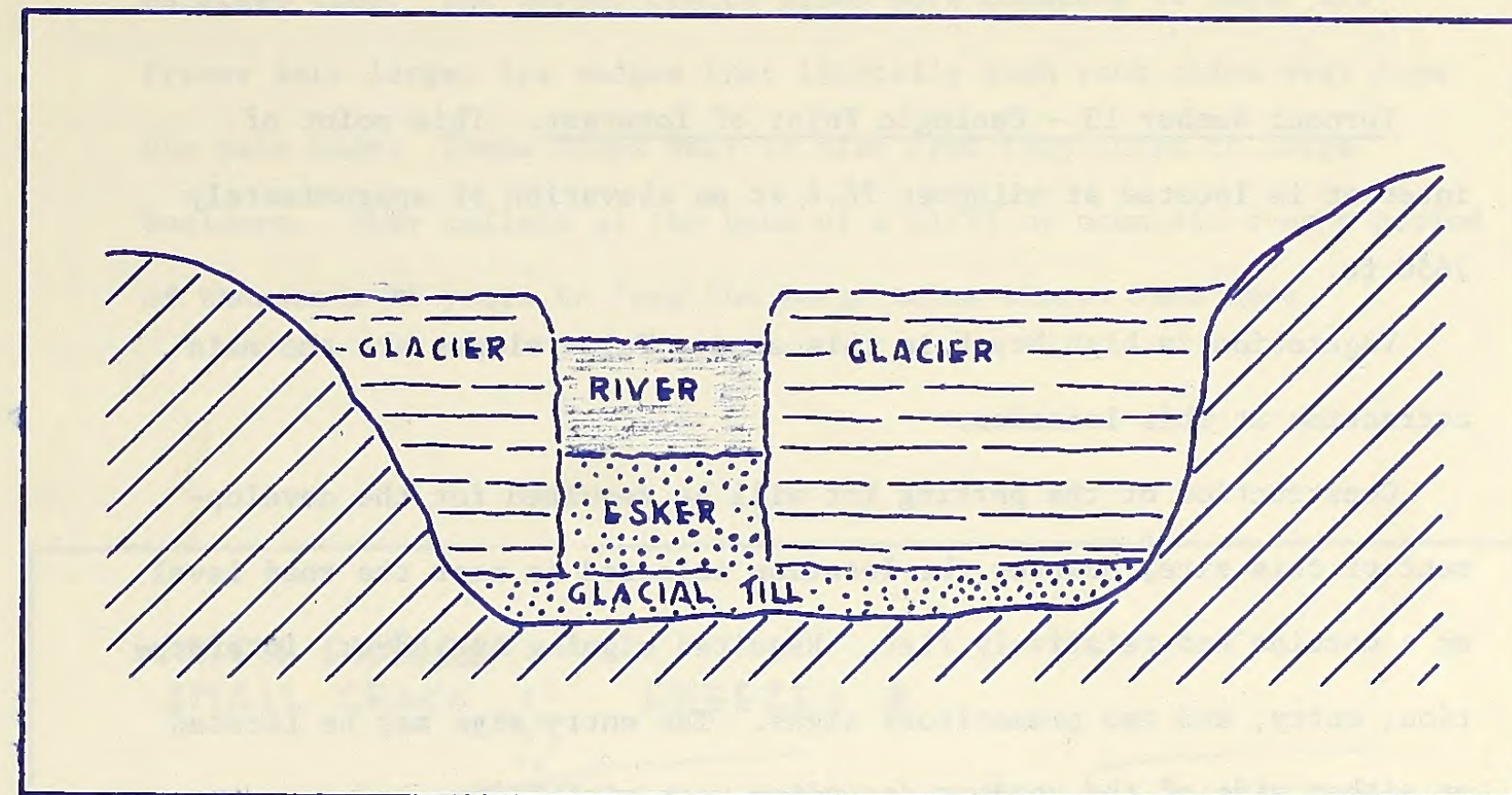


FIG. 41

FORMATION OF AN ESKER

Turnout Number 13 - Geologic Point of Interest. This point of interest is located at milepost 76.6 at an elevation of approximately 2650 ft.

Vegetation is high brush in this area. Talus slopes are the main attraction at this location.

Construction of the parking lot will be required for the development of this site, however the location selected is near the road level on a moraine and relatively flat. Required signing includes: Interpretation, entry, and two premonitory signs. The entry sign may be located on either side of the roadway depending upon visibility.

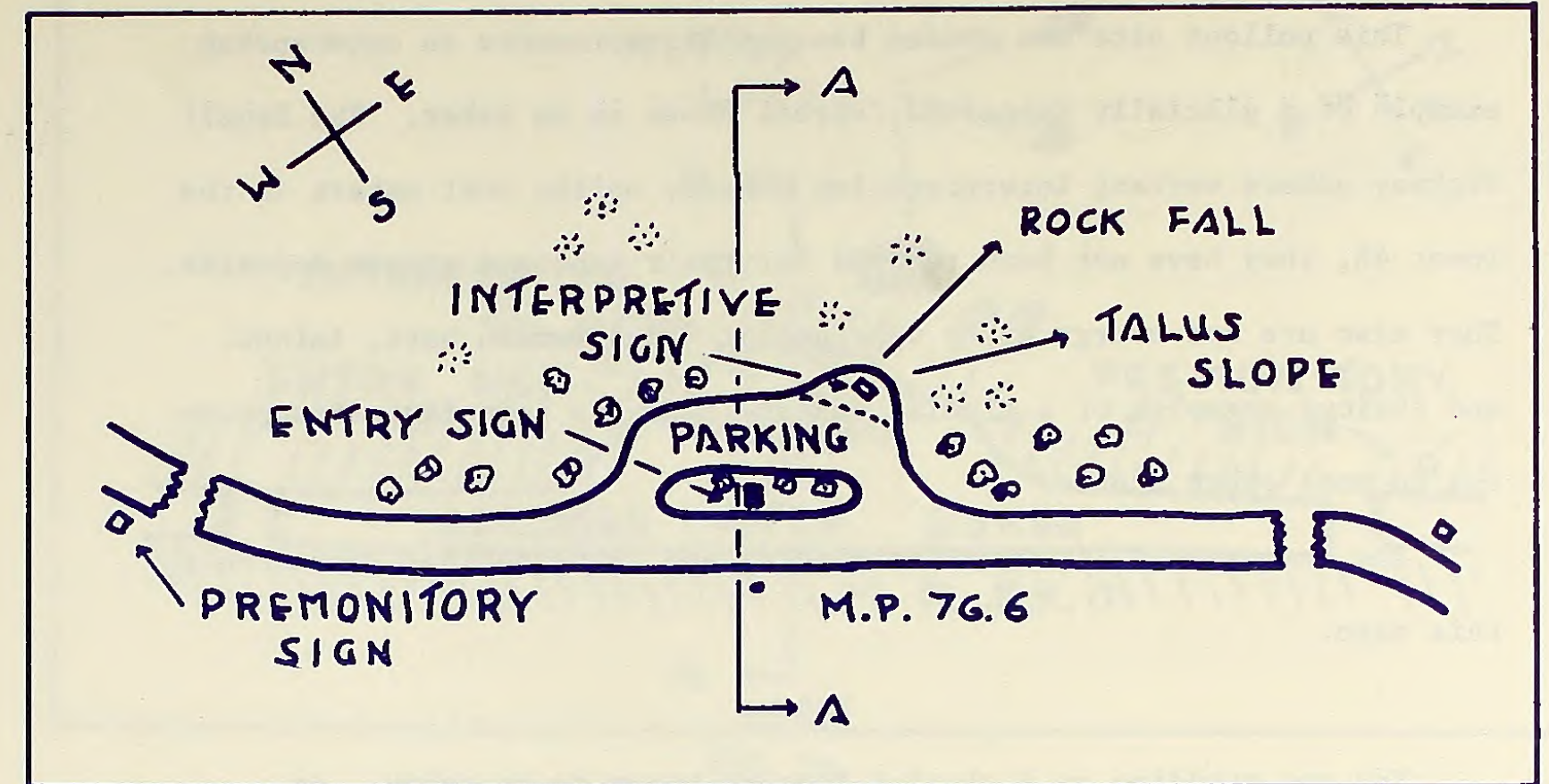


FIG. 42

SITE PLAN FOR PULLOUT NO.13

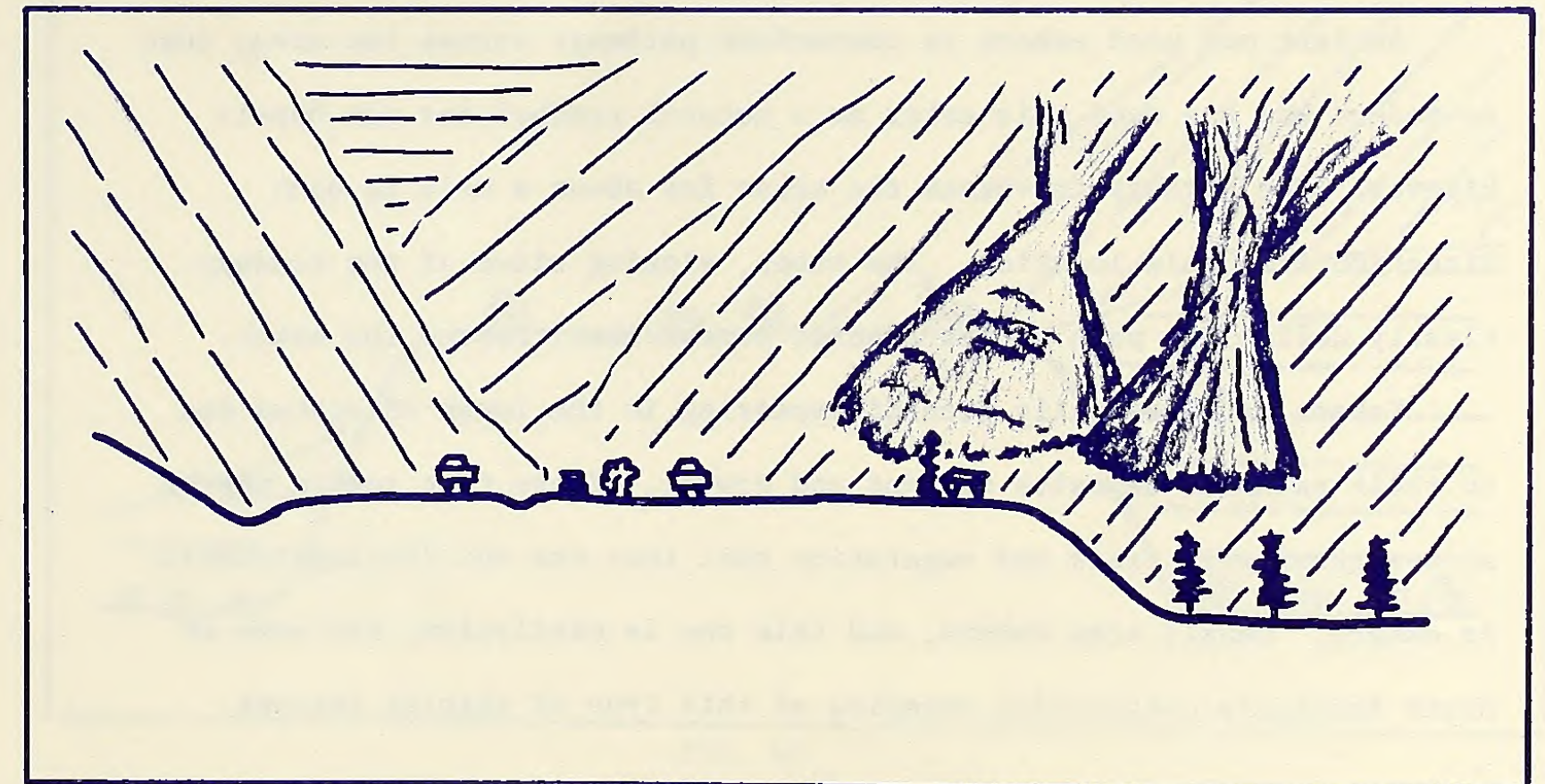


FIG. 43

SECTION AA

Talus Slopes

The two fans of rock material on the mountain side before you are talus slopes. Talus is rock fragments that have been chipped from a mountain or cliff by the wedging action of water in a recurring freeze-thaw cycle. Tiny cracks form in rock material as it expands with summer heat and contracts with winter cold. Water enters these tiny cracks and over a period of years, through repeated freezing and thawing, gradually enlarges them. The larger cracks allow more moisture to enter and freeze into larger ice wedges that literally push rock chips away from the main body. These chips vary in size from tiny chips to large boulders. They collect at the base of a cliff or mountain over a period of thousands of years to form the large talus slopes seen here.

Turnout 13 - Geologic Point of Interest, M.P. 76.6

This pullout was selected because it offers a close view of the effect of weather - water, temperature extremes, and the wedging action of frost and ice to form talus slopes. These are clearly visible from the highway and an explanation of how they are formed should be interesting to the visitor.

Recommended interpretive wording and illustrations are presented on this page.

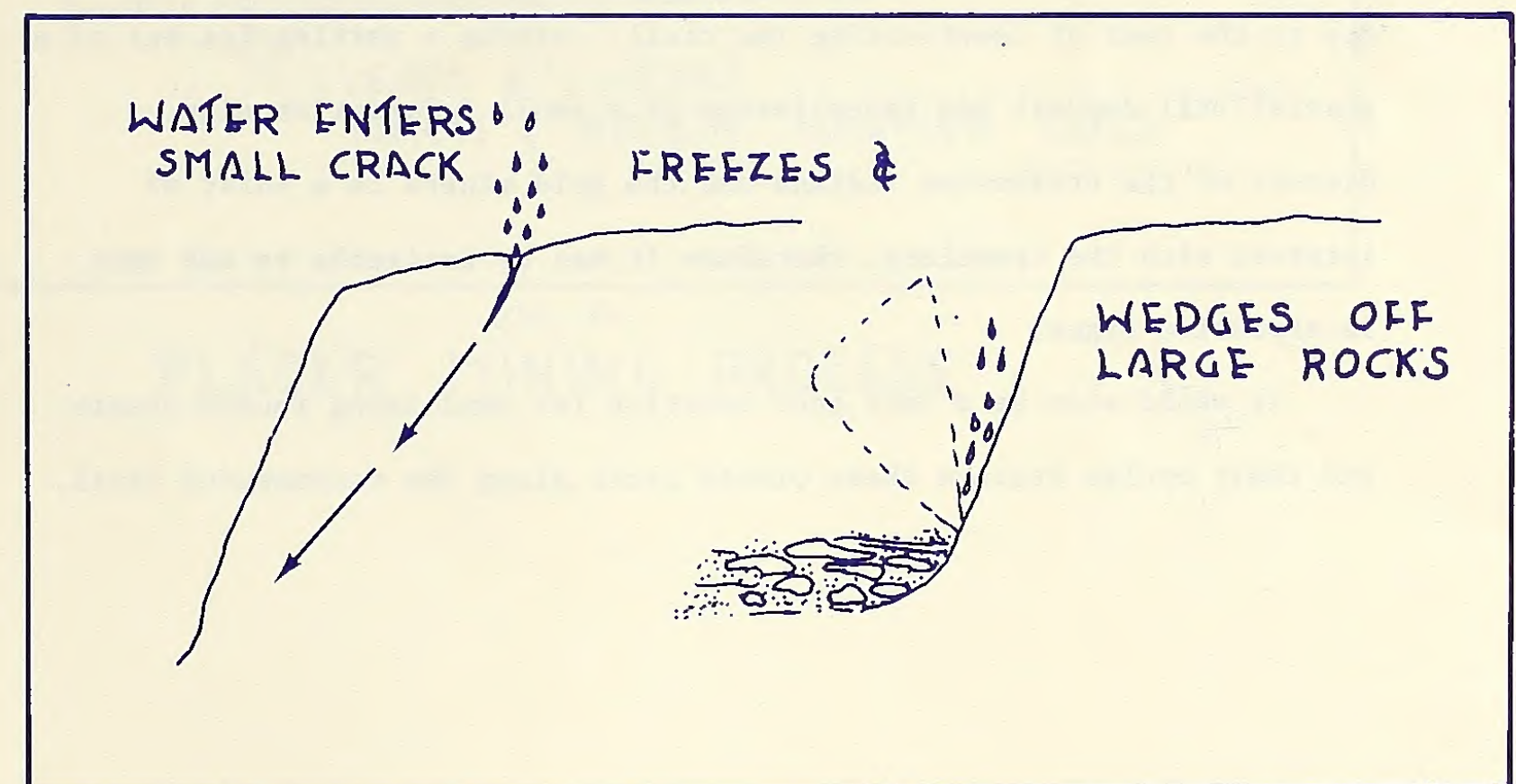


FIG. 44
FROST WEDGING

Turnout Number 14 - Denali Viewpoint. This pullout is located at milepost number 85.0 at an elevation of approximately 2800 ft.

Vegetation consists of wet tundra. This vantage point is reached by a walk of more than 600 yards and a slight climb. The view of Denali, Mt. Debra, Mt. Hess, and the Susitan River is a breathtaking experience from this location and it is well worth the short hike. This location is ideal for interpreting some of the history of the area and demonstrating through illustration the placer gold mining process. The walk is designed to get people out of the vehicle, to enjoy fresh air and to enjoy an exhilarating view.

Development of this site will be more expensive than most other sites due to the cost of constructing the trail, carving a parking lot out of a glacial till deposit and installation of a small information sign. History of the Athabascan Indians and the gold miners is a point of interest with the travelers, therefore it may be desirable to add more interpretive signs.

It would also be a very good location for explaining tundra plants and their cycles because these plants occur along the recommended trail.

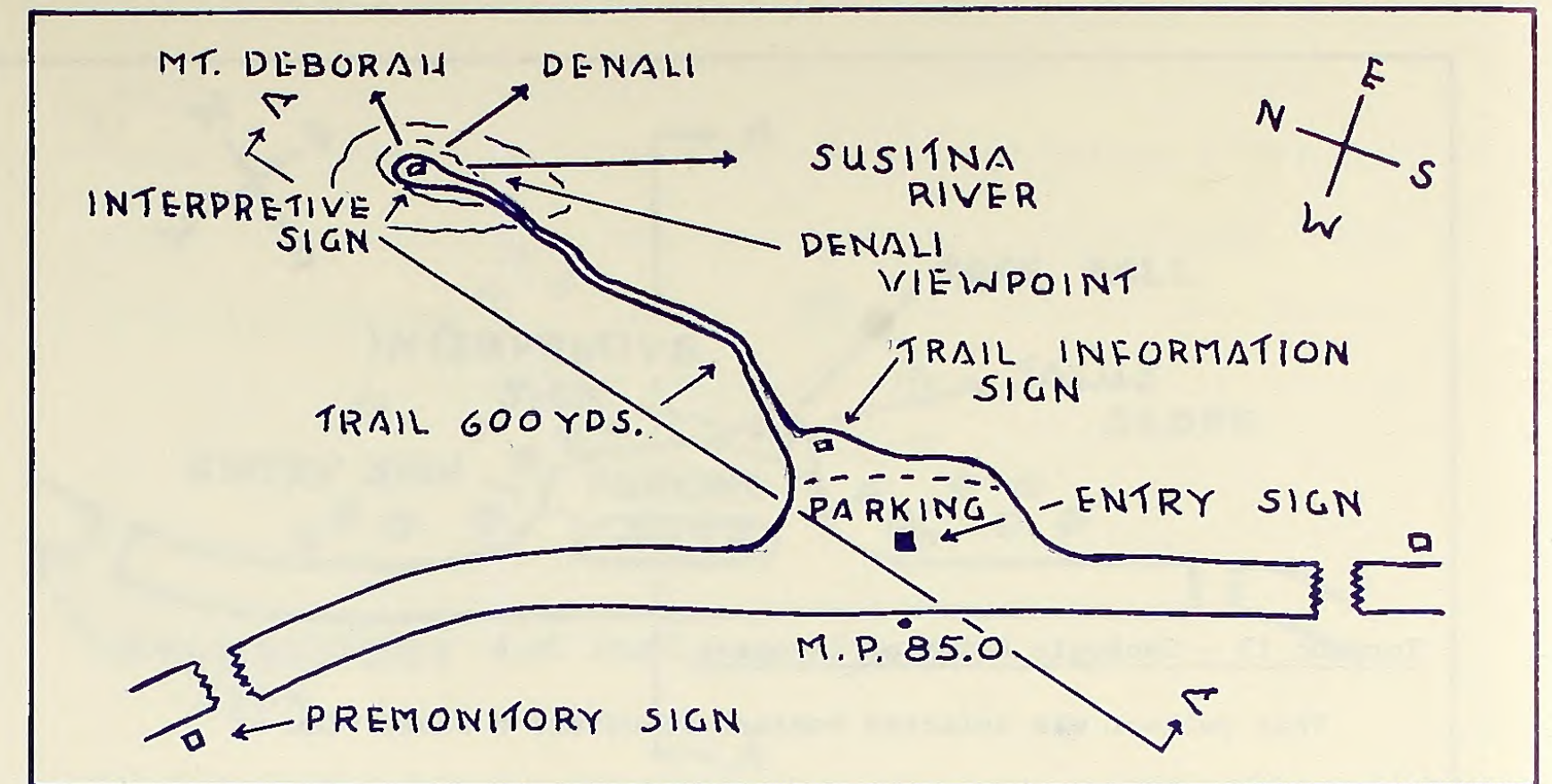


FIG. 45

SITE PLAN FOR PULLOUT NO.14

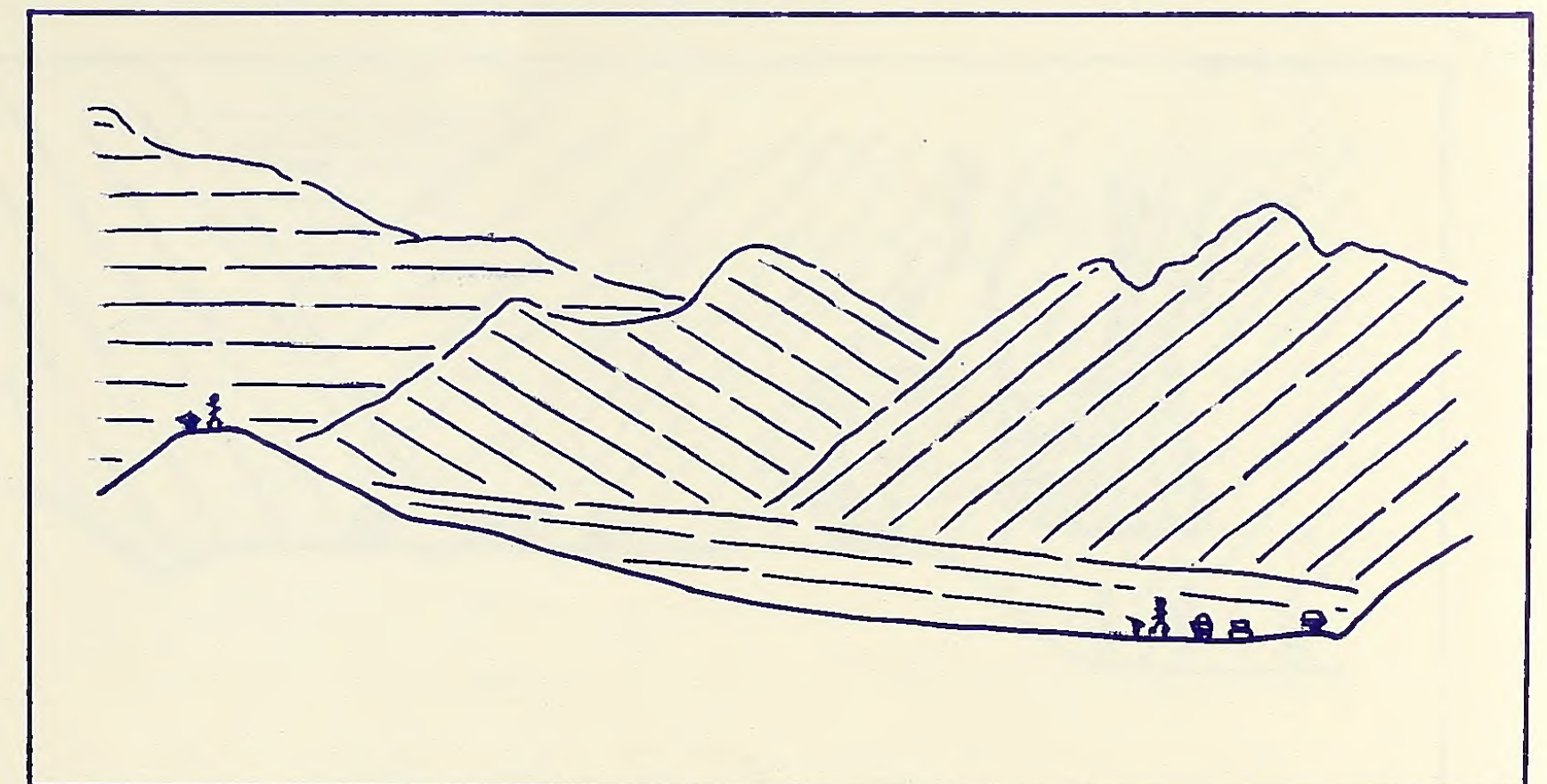


FIG. 46

SECTION AA

Turnout 14 - Geologic and Historic Point of Interest, M.P. 85.0

This site was selected to interpret goldmining in Denali because it affords an excellent panoramic view of the old mining town.

Recommended interpretive wording and illustration for this pullout sign follows.

Denali's "Golden" Days

From this spot can be seen the old mining town of Denali. Denali, pronounced duh-NAH-lee, is the Tanana Indian name for Mt. McKinley meaning "home of the sun" or "the high one."

The Athabascan Indians came to the Denali area from the Copper River region southeast of this area and settled the town of Denali long before the white man came to mine gold. When Pete Monahan struck gold in Denali in 1903, the town was a sleepy little native hunting village of about 100 persons.

Fortunes were sought at Denali, but few men made the "big strike." Eventually, the McKinley Gold and Placer Mining Company acquired the rights to most area claims and operated a successful gold mining operation using a water washing process called placer mining.

Gold production in Denali tapered off in the late 1930's, and today only three mining claims are being worked.

Be silent and listen - you may hear the picks and shovels of the old time prospector probing the earth for its precious gold.

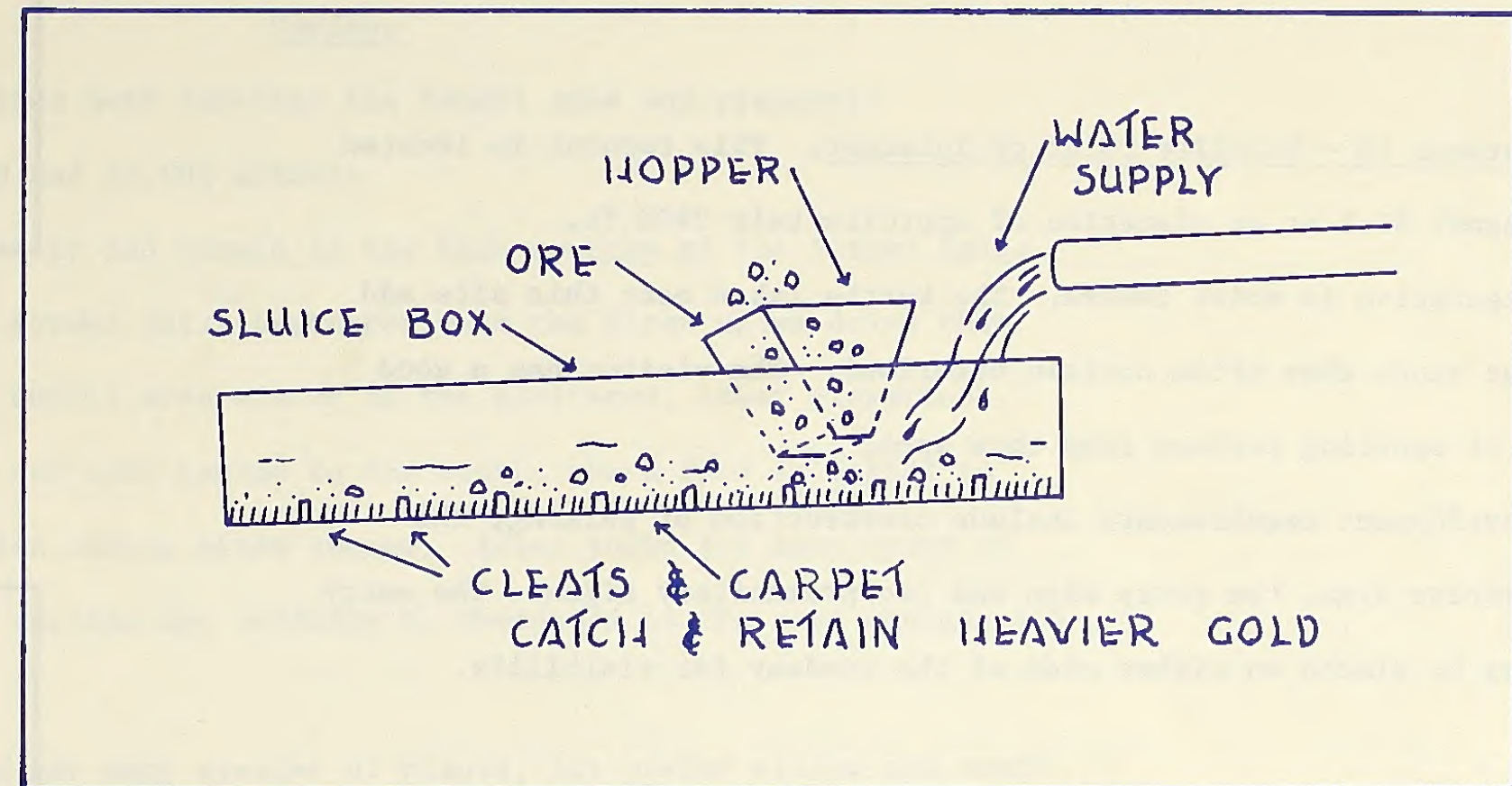


FIG. 47

PLACER MINING PROCESS

Turnout 15 - Wildlife Point of Interest. This turnout is located at milepost 89.2 at an elevation of approximately 2900 ft.

Vegetation is moist tundra. The kettle lakes near this site add interest since they often contain waterfowl. The visitor has a good chance of spotting caribou from this spot.

Development requirements include construction of parking, the interpretive sign, the entry sign and two premonitory signs. The entry sign may be placed on either side of the roadway for visibility.

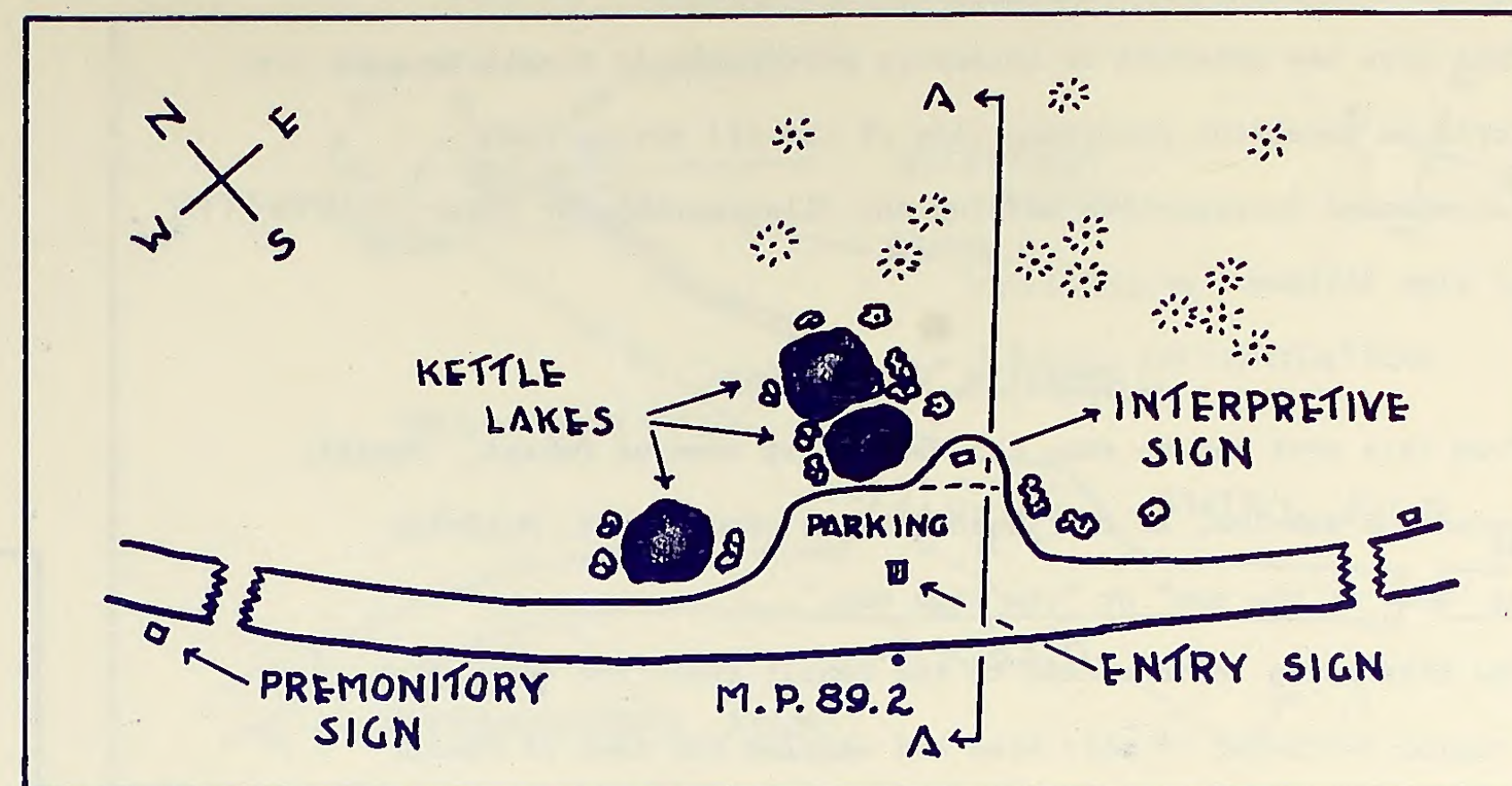


FIG. 48

SITE PLAN FOR PULLOUT NO.15

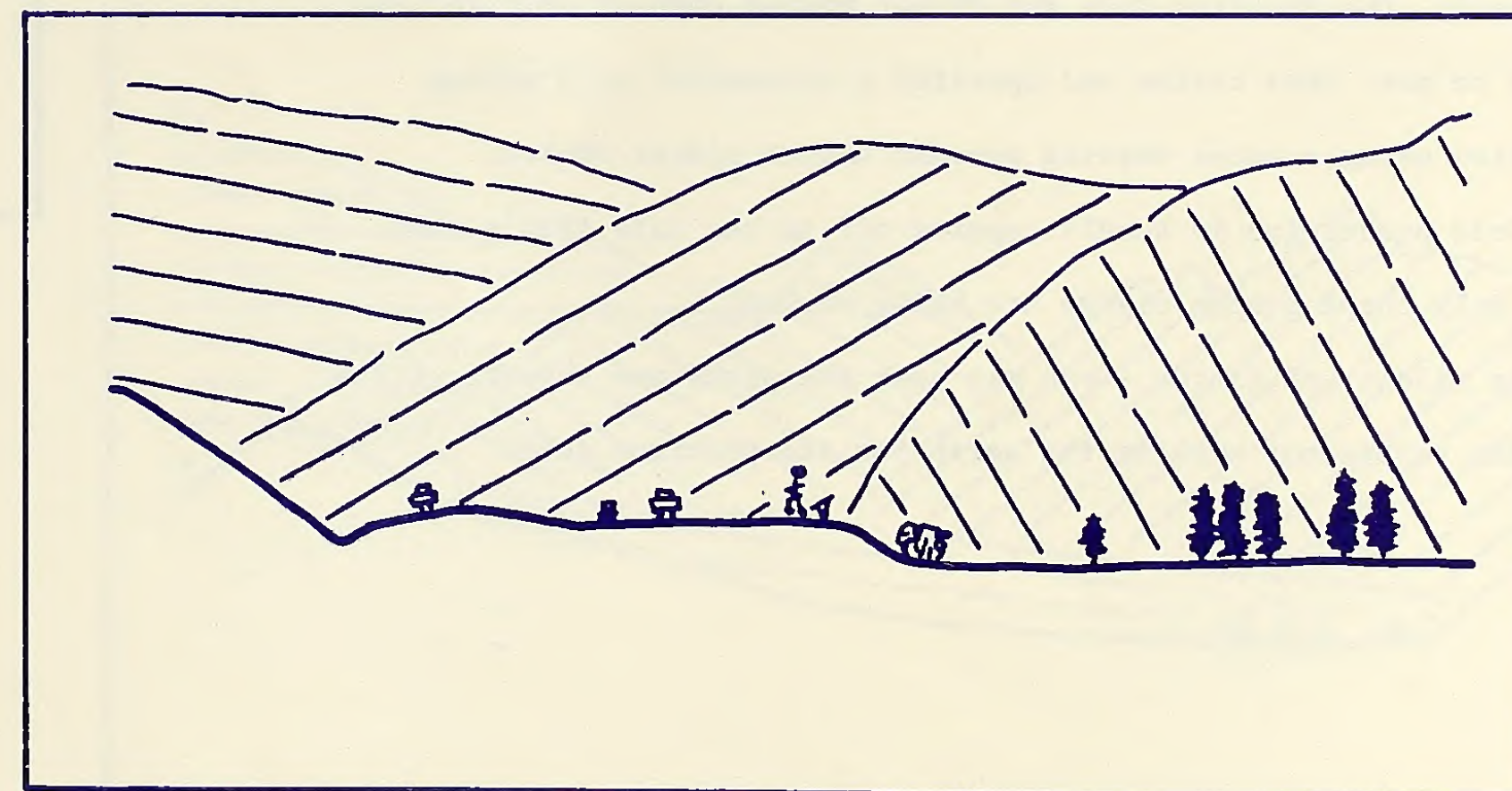


FIG. 49

SECTION AA

Turnout 15 - Wildlife Point of Interest, M.P. 89.2

This site was originally selected to interpret the kettle lakes present here, but it was decided that caribou should be talked about since excellent examples of kettle lakes exist at Turnout 7. This area is good caribou habitat and they are often seen along this stretch of highway.

Recommended interpretive wording is presented below. An illustration of a bull caribou should be included on this sign.

Caribou

The Nelchina caribou herd inhabits the Denali area and presently numbers between 10,000 and 20,000 animals.

Caribou are migratory and remain in the high country of the Alaska Range during the spring and summer until September when the first snows drive them down. Caribou in the Denali area winter in the sheltered, lower elevations such as Monahan Flats and Lake Louise to the south, where food is easier to find. Caribou migration routes often change. Areas known for many years to have large numbers of caribou may suddenly be abandoned as the herd changes its migration pattern.

In summer caribou eat many species of plants, but prefer willow and dwarf birch leaves, grasses and sedges. Winter diet consists of lichens ("Reindeer moss"), and dried sedges. Both male and female caribou grow antlers which are shed each year.

Turnout Number 16 - Botanical Point of Interest. This pullout is located at milepost 111.4 at an elevation of approximately 2500 ft.

Vegetation consists of high brush, upland spruce hardwood forests and bottomland spruce, poplar forests. Trees and other plant life are the focal point of this location. Description of varied climatic effects upon plant life are reserved for this stop.

Improvement of this site will require the stripping and grading of the parking space. The land is virtually level with the roadway, therefore little material must be moved. Sign requirements include interpretive, entry, and two premonitory signs.

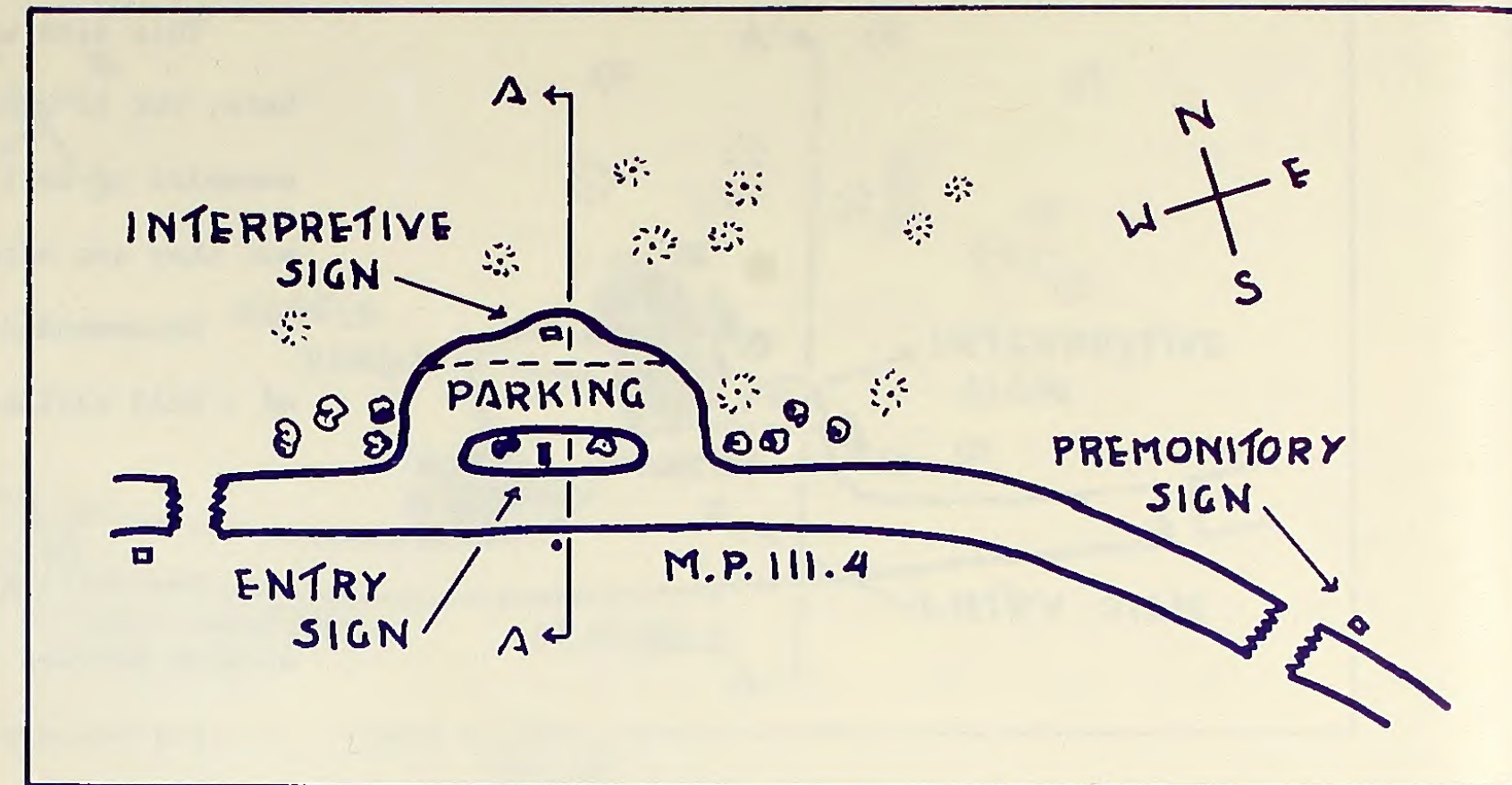


FIG. 50

SITE PLAN FOR PULLOUT NO. 16

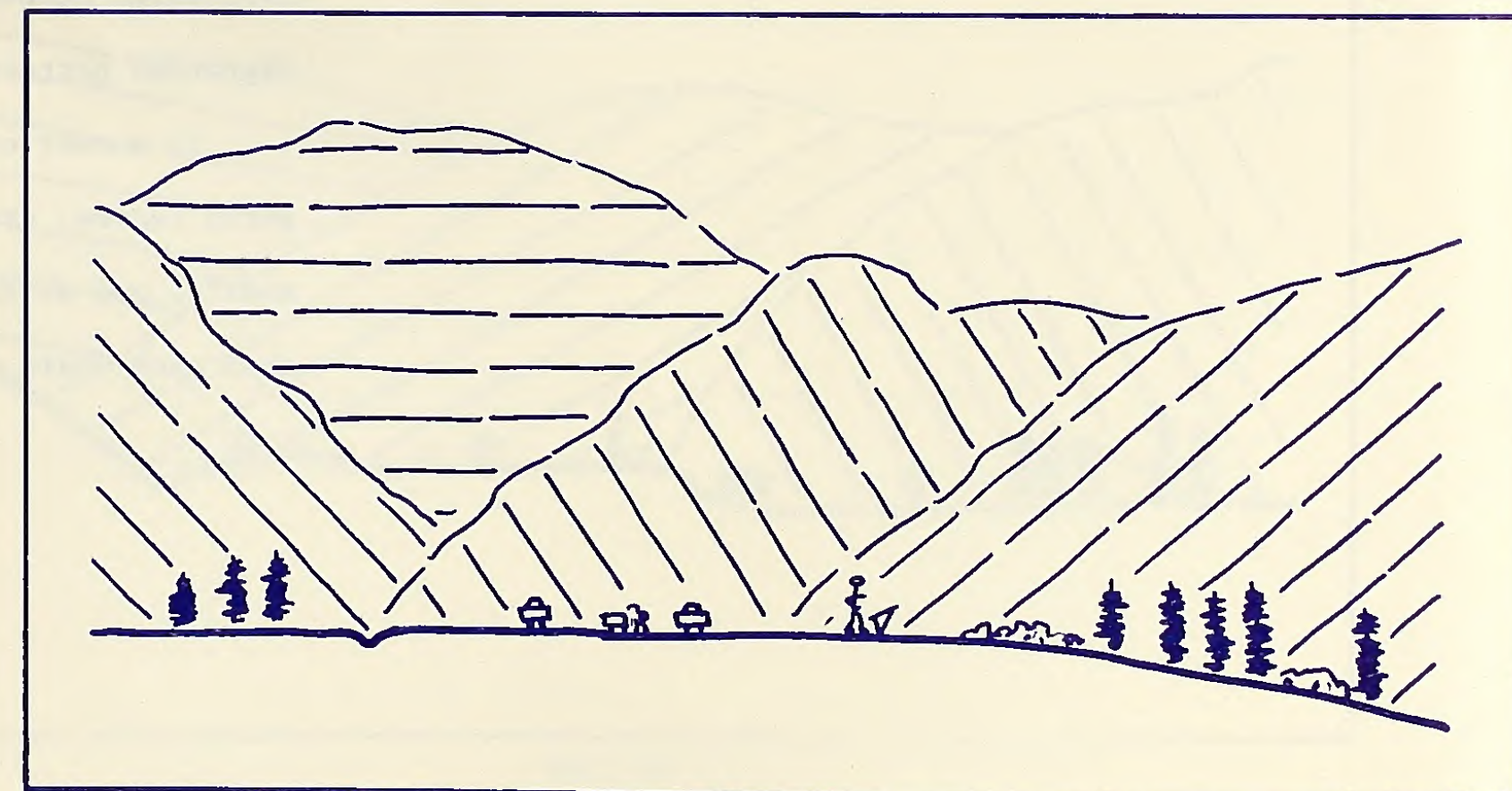


FIG. 51

SECTION A A

Turnout 16 - Botanical Point of Interest, M.P. 111.4

This site was selected as an interpretive pullout because it offers good views of trees and other vegetation whose growth has been stunted due to permafrost, climatic conditions, elevation, aspect and other factors that retard plant growth. The visitor will probably notice the small size of trees in the Denali area and an explanation of this would be of interest.

The recommended interpretive sign wording and illustrations are presented on this page.

Vegetation Growth

Trees and vegetation in the Denali Highway area, tend to be smaller and shorter than their counterparts in the lower 48 states due to several factors that influence their growth. Much of the Denali area is underlain by a layer of PERMAFROST, or ground that is frozen throughout the year. Permafrost restricts root growth to the upper layers of the rocky soils in this area, thereby restricting growth of trees and other vegetation. Latitude, or the distance an area is from the equator, also limits plant growth. The far north latitude of the Denali area is extremely cold in winter and cool in summer with a short growing season. Vegetation has little time to grow before low temperatures again bring long periods of non-growth, or dormancy. Aspect is the direction, or exposure of a plot of ground, in relation to the sun. Trees growing on the north side of a hill or mountain slope receive less sunlight and correspondingly cooler temperatures than those growing on south slopes and so grow smaller. Permafrost is also generally closer to the surface on north slopes, causing north slope vegetation to be somewhat more

stunted than that on south slopes. The last major factor that reduces plant size and height in the Denali area is the shallow, rocky soil conditions that are common throughout the area.

The black spruce, dwarf willow and ground vegetation you see from this point have all had their growth stunted by one or more of the above factors and are smaller than their southern United States relatives.

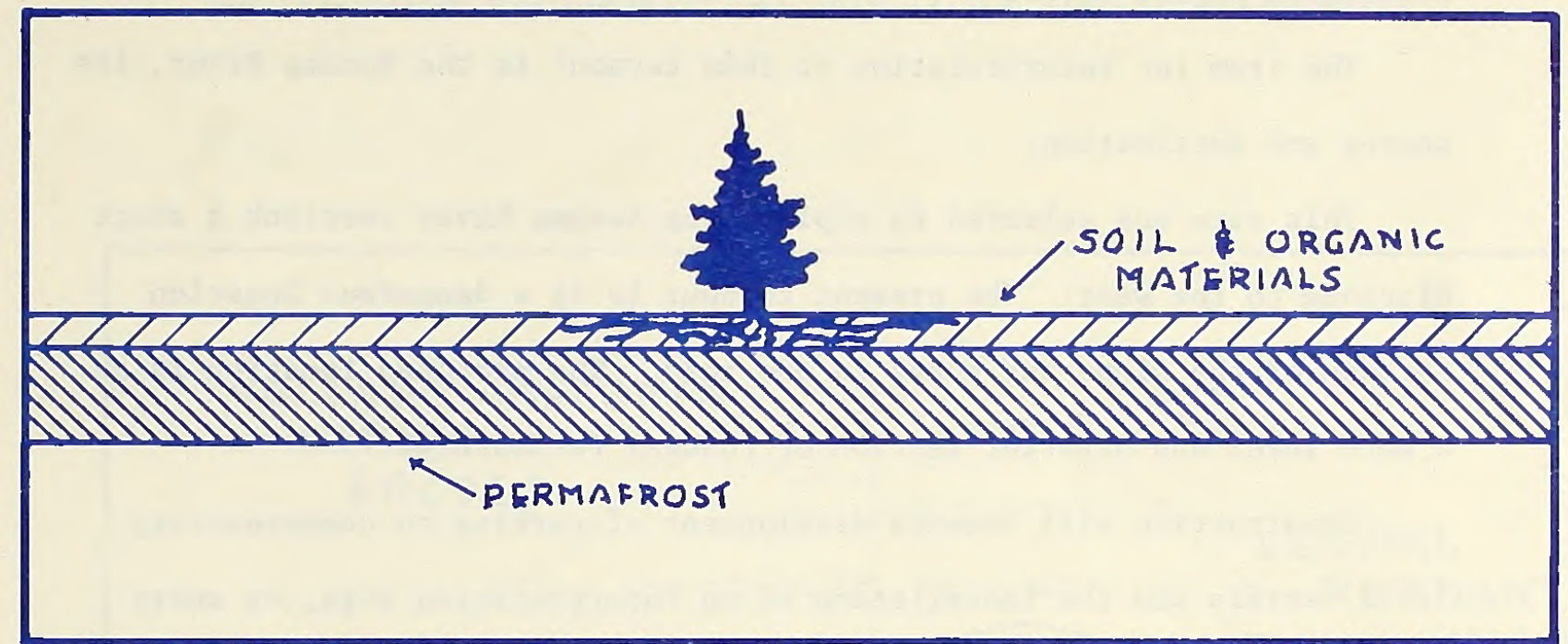


FIG. 52

EFFECTS OF PERMAFROST ON VEGETATION

Turnout Number 17 - Nenana River Viewpoint. This pullout is located at milepost 115.4 at an elevation of approximately 2600 ft.

Vegetation consists of high brush, upland spruce hardwood forest and bottomland poplar forest.

The item for interpretation at this turnout is the Nenana River, its source and destination.

This site was selected to replace the Nanana River overlook a short distance to the west. The present turnout is in a dangerous location because of the slope and curve in the road. The proposed location is on a more level and straight section of roadway for safety.

Construction will require development of parking on comparatively level terrain and the installation of an interpretation sign, an entry sign and two premonitory signs.

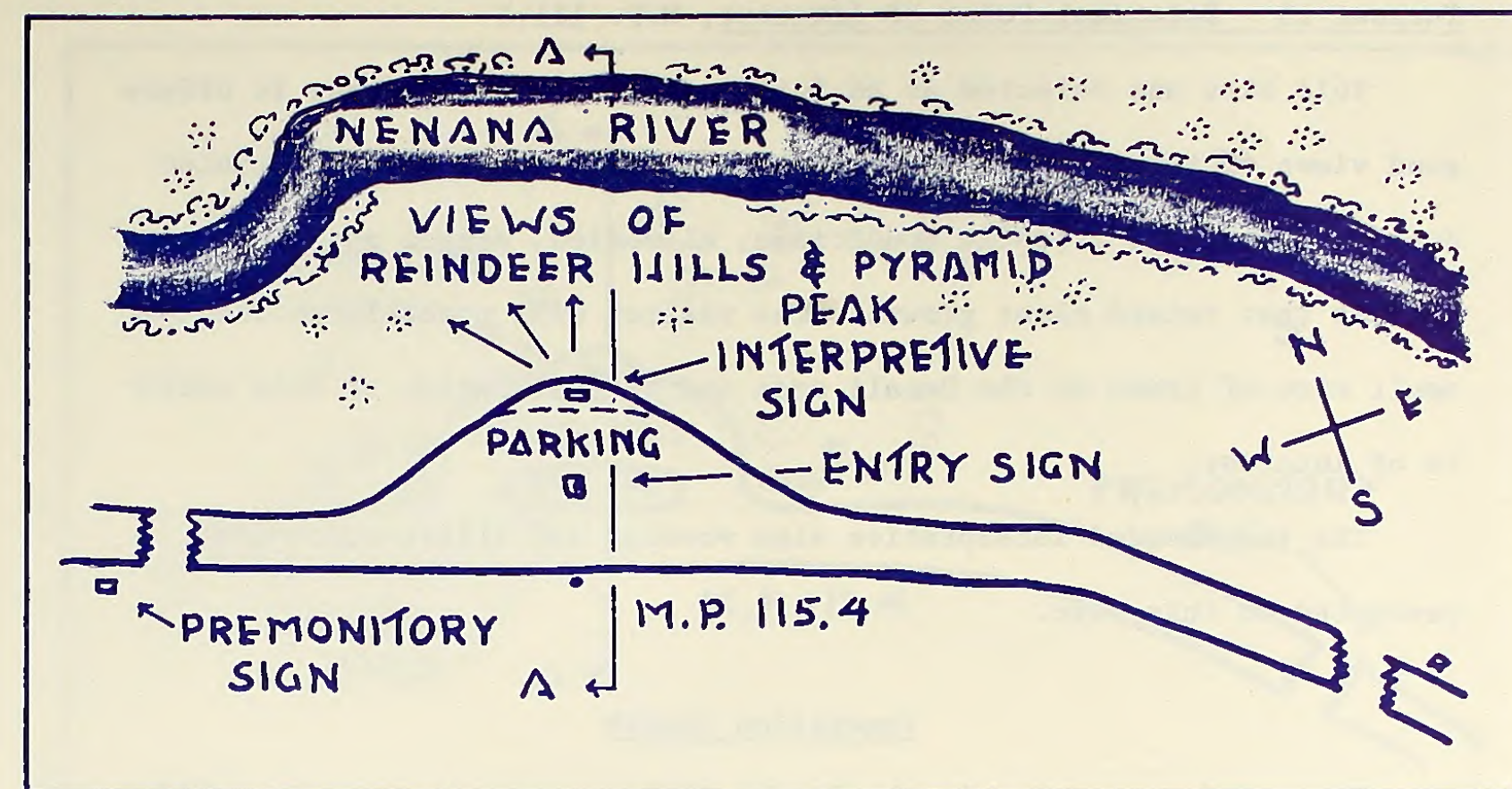


FIG. 53

SITE PLAN FOR PULLOUT NO.17

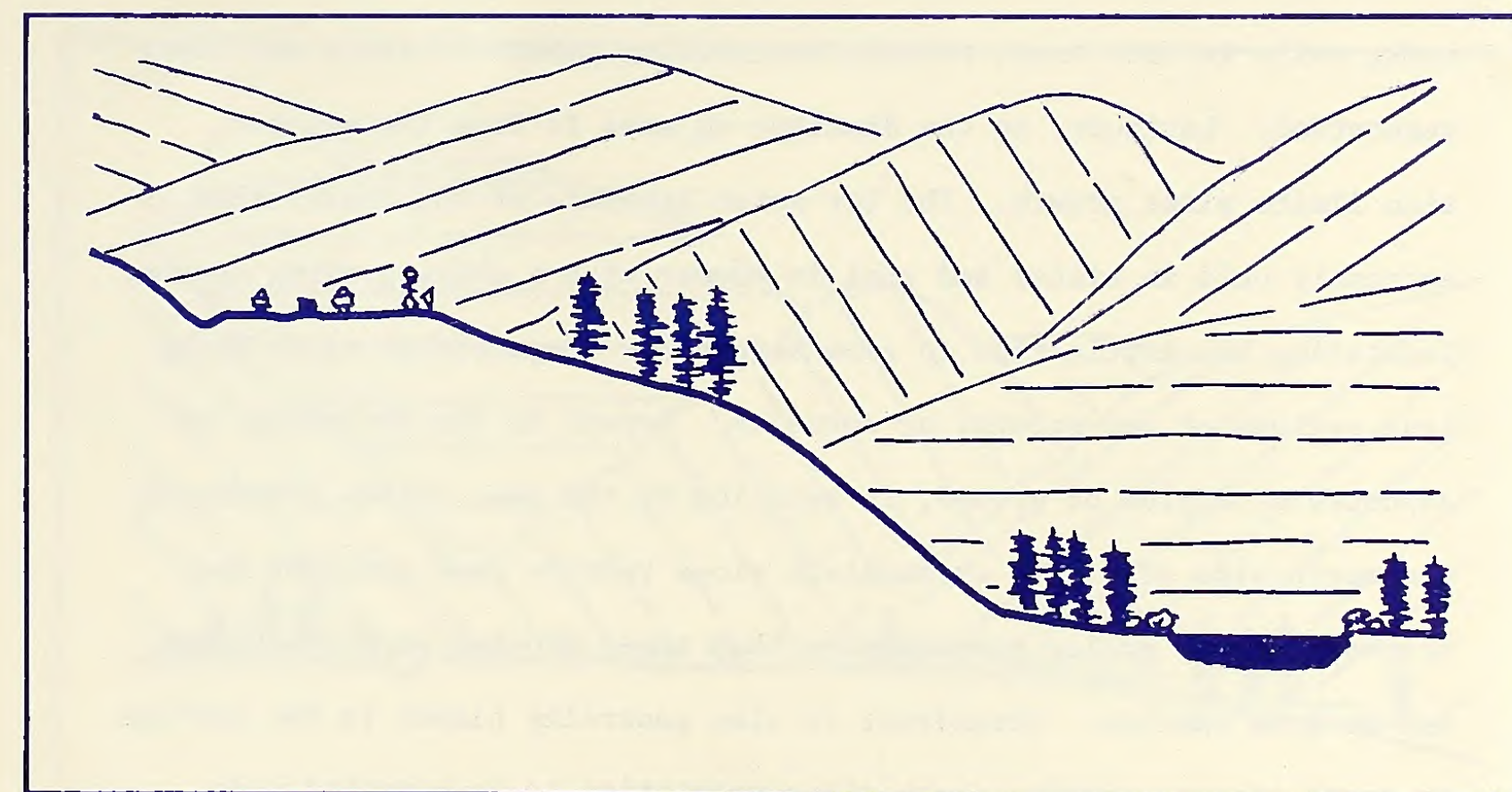


FIG. 54

SECTION AA

Nenana River

The Nenana River is a glacial river whose primary source is the Nenana Glacier. Nenana, pronounced nee-NA-nuh, is an Indian word of unknown meaning. The river flows into the Tanana River west of Fairbanks, which flows into the Yukon River and out to the Bering Sea. The Nenana is not a good fishing stream because it carries a heavy glacial silt load during the summer. The spruce-poplar forests along its banks provide excellent habitat for moose, black bear and bald eagle.

The reddish colored Pyramid Peak, seen in the background, is thought to be the remnant of a large volcano which has been eroded away, leaving the harder, more resistant, volcanic rock. The reddish color is caused by iron which has oxidized and stained the surface of the rocks.

Turnout 17 - Nenana River Viewpoint, M.P. 115.4

This site was selected for its excellent view of the Nenana River and the Pyramid Peaks. The Nenana Glacier forms a major source of supply for the Nenana River which is one of the three major drainages in the Denali Highway area. The Pyramid Peaks are volcanic in origin and an explanation of their formation and reddish color would be interesting to most visitors.

Recommended interpretive sign wording and illustration are presented on this page.

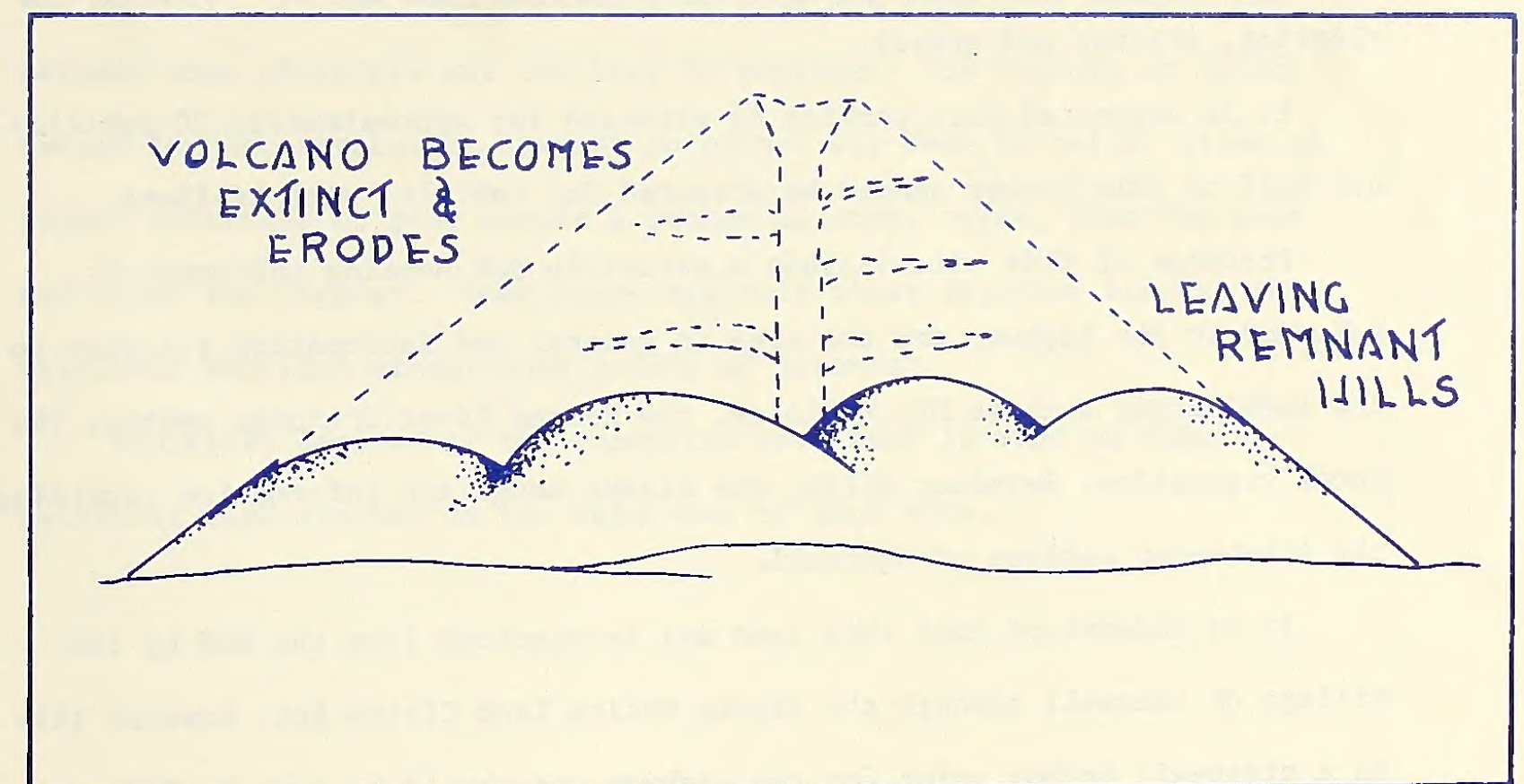


FIG. 55

FORMATION OF PYRAMID PEAK

Site Plan for Turnout Number 18 - Visitor Information Center Cantwell.

This pullout is located at milepost 130.1 at approximately 2450 feet elevation. Vegetation in the vicinity consists of bottomland spruce poplar forests ecosystem along the highway and to the north, and the high brush vegetative ecosystem to the south. The site is located on high ground with sparse vegetation in the immediate vicinity.

This location for the Cantwell entry station was chosen because it offers unobstructed views of Mt. McKinley to the west. The Reindeer Hills lie to the north and the Jack River Valley and lesser mountains of the Alaska Range lie to the south.

The turnout proposed is situated on reasonably level terrain along a straight portion of the roadway. The turnout is planned for the south side of the road. A large area, probably as much as 15 acres is available if expansion of the site is ever necessary. It is undisturbed land; will need clearing, grading and gravel.

It is suggested that parking be arranged for approximately 20 vehicles and half of this number should be prepared for vehicles with trailers.

Features of this site include a structure for housing information relevant to the highway and the area in general and information relevant to the local scene such as Mt. McKinley, the Nenana River drainage system, the local vegetation, Reindeer Hills, the Alaska Range and information regarding the Athabascan natives of Cantwell.

It is understood that this land may be acquired from the BLM by the village of Cantwell through the Alaska Native Land Claims Act, however this is a strategic anchor point for the highway and should be kept in BLM ownership.

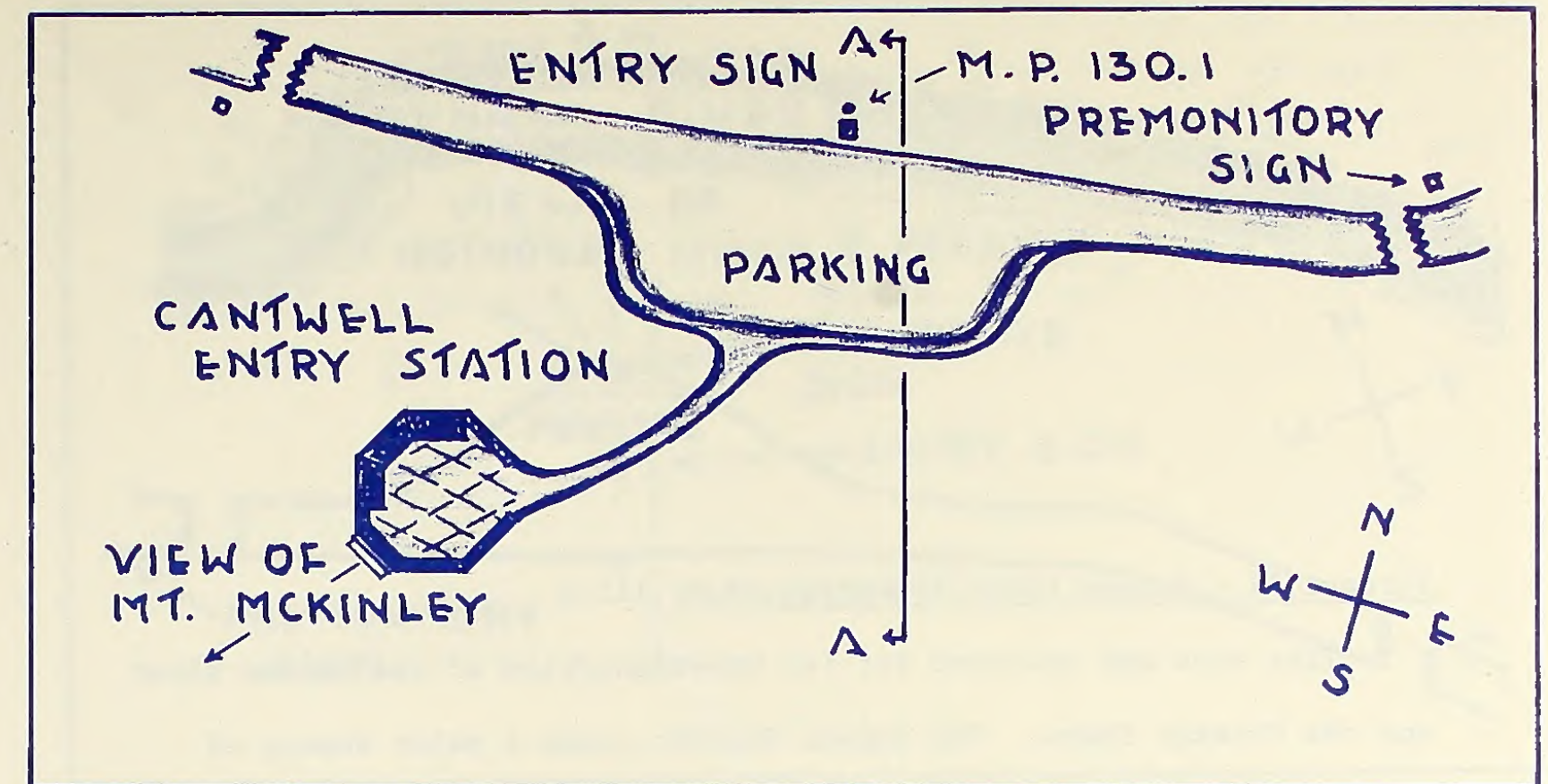


FIG. 56

SITE PLAN FOR PULLOUT NO. 18

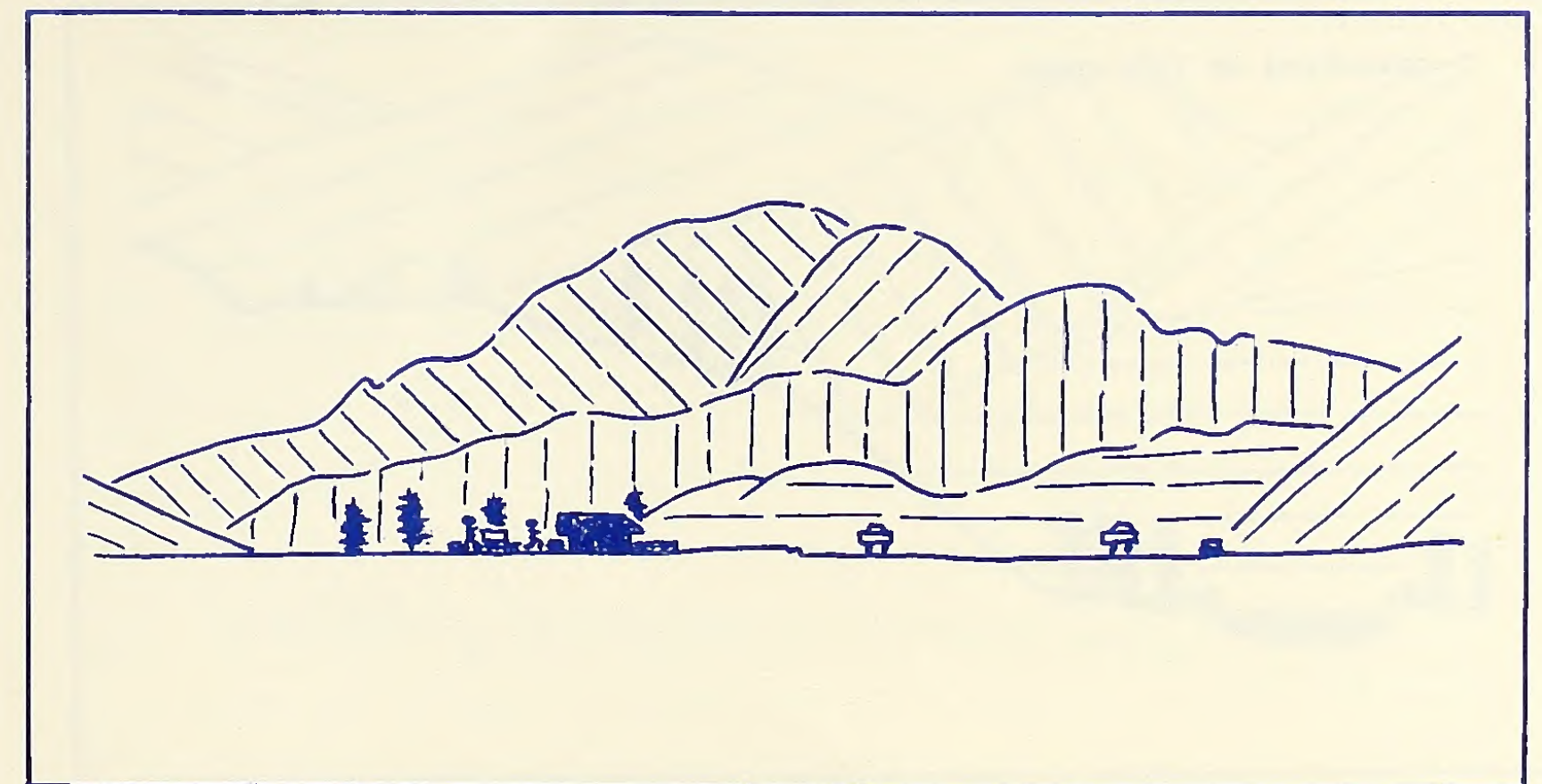


FIG. 57

SECTION A-A

Visitor Information Center - West End, M.P. 130.1

This site was chosen as the visitor information and entrance station for this highway's western end, primarily because it offers an excellent view of Mt. McKinley. It is a good location for photographing the mountain when weather conditions are favorable.

Recommended interpretive wording is presented here:

Mt. McKinley

The highest mountain in North America was named in 1896 by prospector William A. Dickey in honor of William McKinley when he heard the news of the future 25th president's nomination. Approximately four-fifths of its 20,320 ft rises above the surrounding landscape making its foot-to-summit rise greater than that of Mt. Everest. McKinley's twin peaks are called Churchill Peaks, a name applied by the National Park Service in 1965 to honor Sir Winston Churchill. The 19,470 ft North Peak was first climbed on April 3, 1910 by William Taylor and Pete Anderson of the Sourdough Prospectors party, who thought they had reached the true summit. The South Peak, which is the true summit by 850 ft was first ascended on June 7, 1913 by Episcopal Archdeacon Hudson Stuck, Walter Harper, Harry P. Karstens and Robert G. Tatum. They are commemorated by one or more namesake features within Mt. McKinley National Park.

General information about the highway as proposed for the Paxson Information Center applies for the Cantwell Center. The information regarding services and natural resources as requested by travelers in the user inventory should be included, however different areas of interpretation for natural resources must be sought to give diversity to the total plan.

This Visitor Information Center shares equal importance with the Paxson Center. It was selected as number 2 priority because it was thought that more traffic flows from east to west.

Summary

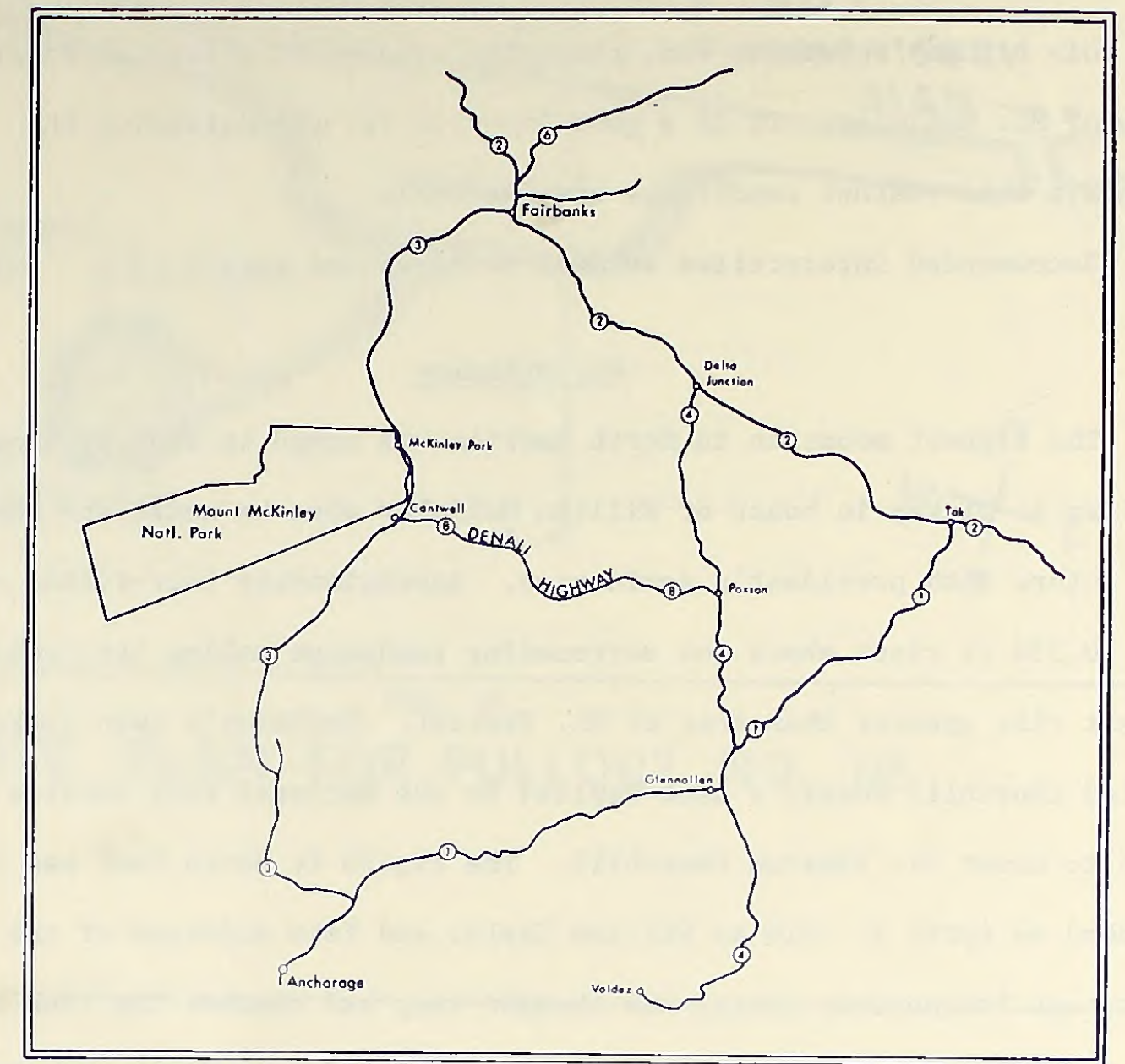
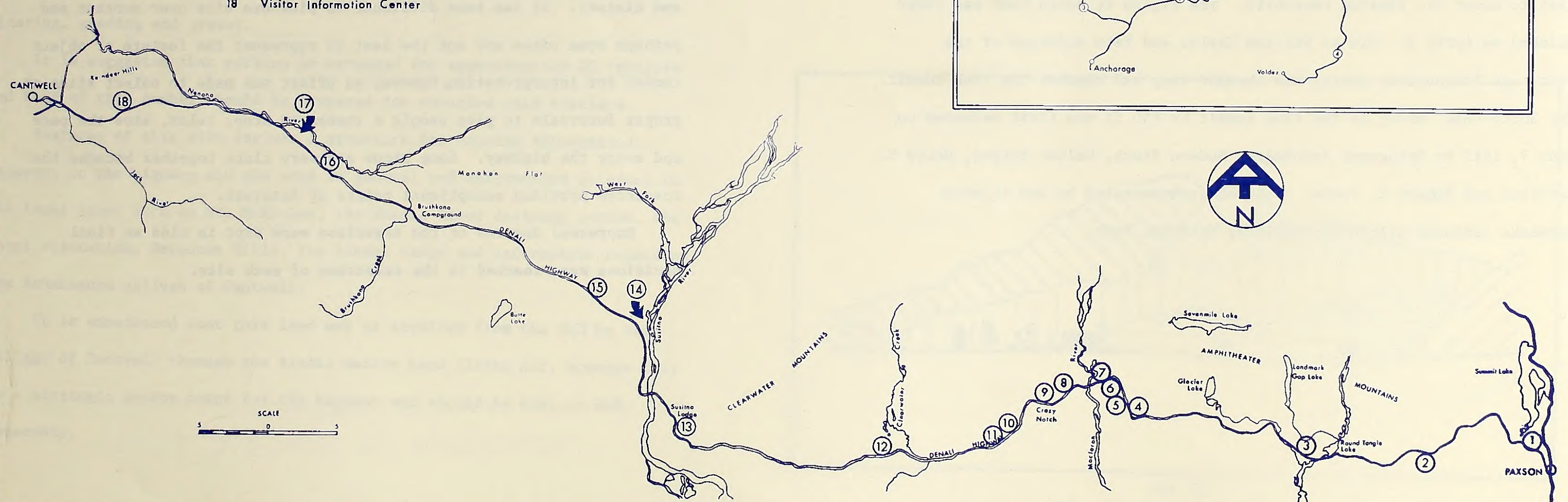
The visitor information centers and pullouts along the route have been selected from dozens of attractive sites. These sites in total give a broad range of information from services to natural features, wildlife and history. It has been difficult to pick one site over another and perhaps some sites are not the best to represent the feature or object chosen for interpretation, however an effort was made to select sites at proper intervals to give people a reason to stop, relax, slow the pace and enjoy the highway. Some stops are very close together because the resources provided exceptional points of interest.

Expressed desires of the travelers were kept in mind as final decisions were reached in the selection of each site.

DENALI HIGHWAY

Visitor Information & Points of Interest

- 1 Visitor Information Center
- 2 Wrangell Mountain Viewpoint
- 3 Landmark Gap Viewpoint
- 4 Alaska Range Viewpoint
- 5 MacLaren River Viewpoint
- 6 Geologic Point of Interest
- 7 Geologic Point of Interest
- 8 MacLaren Glacier Viewpoint
- 9 Geologic Point of Interest
- 10 Wildlife Point of Interest
- 11 Wildlife Point of Interest
- 12 Geologic Point of Interest
- 13 Geologic Point of Interest
- 14 Denali Viewpoint
- 15 Wildlife Point of Interest
- 16 Botanical Point of Interest
- 17 Nenona River Viewpoint
- 18 Visitor Information Center



Pamphlet Program

The two recommended public information pamphlets have been designed to be used with the latest general information pamphlet, now being used. The fishing and hiking pamphlets are simple in design, yet functional. They provide the visitor with information that ranked high in the user inventory as desired information. Fishing locations, access and fish types are provided in the fishing pamphlets, while trail locations, and descriptions are listed in the hiking pamphlets. Both provide easy to ready locational maps.

The information provided in the fishing pamphlet was obtained by field investigation and from Alaska Sport Fishing Guide printed by the Alaska Department of Fish and Game. The hiking trail information was compiled through 10 weeks of field investigation, and trail inventories by two Colorado State University students who worked for the BLM in that capacity.

These pamphlets should be readily available to highway users and should be distributed at Paxson Lodge, both visitor information centers recommended by the plan, the lodges and inns along the Denali Highway, and at selected stores and service stations in Cantwell.

Recommended pamphlet designs and information are presented in Appendix D of this report.

Interpretation Through Local Residents

Travelers who were surveyed along the highway indicated interest in knowing more of the history of the area and more about the natives (Athabascan Indians). There was little interest expressed with regard to gold mining, however there is some mining activity in the village of Denali and a visit to this area could be a highlight for most any touring family.

There are two programs that have high appeal to the researchers for disseminating information from residents of the area to the visitor; living history and radio tape.

Living History

The researchers met and interviewed most of the residents along the highway. Four of those interviewed were exceptionally interesting individuals. It is suggested that further study be given to learn how these kinds of residents may be used as on-the-scene interpreters. Several areas of expertise were discovered in talking with the people mentioned above:

1. Doc Huffman at Paxson is a retired dentist. He has traveled all of Alaska; to remote villages and areas treating natives and others in the back country. He is a long time resident of the Denali area, is knowledgeable of the local history and Alaska history in general. He has a seemingly limitless store of stories about people, wildlife, weather, etc.
2. Leroy "Shorty" Kercher is a long time resident of the village of Denali. He owns several mining claims in Denali and has mined gold there for about 35 years. He lives alone, the year around in Denali. "Shorty"

also has a limitless bag of very interesting stories about the area, wildlife, people and gold mining - an unforgettable experience would be a family trip to pan gold with a real Alaskan "sourdough."

3. Mr. and Ms. Jim Grimes live at milepost 100 on the highway. He is a trapper and guide. He and his family homesteaded on the highway and they have some limited tourist accommodations. Jim guides hunting and fishing expeditions and traps in the winter. They too have a storehouse of interesting tales of their experiences, of the long winters and the beauty of living under the northern lights in this remote region.

4. Henry Peters is an Athabascan Indian Chief who resides in Cantwell. He is retired from the railroad and has a wealth of information regarding the Indians, their arts and livelihood. He was born and grew up in the village of Denali, therefore he has knowledge of the history of Denali before gold was struck there and how the strike affected the local population and their way of life.

These four people reside at strategic locations along the highway. They, and perhaps others, could be valuable assets to planned interpretive programs. They could relate their stories on a scheduled basis or on a "drop by" basis. This is assuming that some or all of them would be willing to participate in such a program.

The employment of people such as these, even on a part-time basis, would also serve to add some protective measure to the highway and the improvements.

Radio Tape

Another excellent informational media method would be using local residents to tape interpretive and informational messages to be played over small, battery-operated radio transmitters placed at strategic

locations along the roadway during the period of heaviest tourist travel. Tapes could be used to explain natural history, wildlife, services, etc. at selected intervals (87).

A great advantage to this system is that they could be boxed and hidden so as to minimize vandalism. They can be tuned in on automobile radios, allowing the visitor to receive information while driving the highway. Therefore, they are especially convenient during inclement weather.

Disadvantages of the system are that one must have a radio to receive, and they may require frequent maintenance. Transmitters require very little maintenance and will run about two weeks under continuous use on a 12 volt battery without charging. The 8 track cartridge tape deck is designed for a continuous play and may require frequent maintenance. Some types may be activated by honking a car horn, others require running over a hose to activate unless run continuously.

The type of antennae is important to achieve the required transmittal distance. One may employ a vertical antenna which will transmit for 1 to 2 miles depending upon terrain and interference or a horizontal antenna may be used and run along the borrow pit of the road to transmit the length of the antenna.

The transmitter is 1/10 watt and they may be operated without a license from the Federal Communication Commission. They perform best if operated in a heated location making operation from lodges along the highway a worthwhile possibility for investigation. This system could benefit businesses along the highway and some may be encouraged to remove unsightly signs and advertise through the radio. Arrangements could be made for local residents to perform the maintenance these units would require.

Yellowstone National Park has used this equipment for six years and is very pleased with the performance. Mr. Allen Mebane, Chief Naturalist, says that low temperature and humidity affect the performance more than any other factors (94). Small enclosed areas could be heated by battery. Some areas are utilizing solar energy to operate the transmitters, however this is probably not feasible along the Denali Highway.

These units are sold by:

Technical Systems, Inc.
1820 South 7th Avenue
Bozeman, Montana

The cost for transmitter, antennae, recorder and play back unit is about \$3,000.

Cost Estimates and Implementation Priorities for the Denali Highway Plan

I. Paxson Entry Station and Visitor Information Center (1st priority)	
A. Buildings	
1. Architect	\$ 1,793
2. Central Bldg. 12' x 18' = 216 sq. ft. @ \$40	8,640
3. Support Buildings (2) 10 x 16 =	
4. 320 sq. ft. @ \$40	12,800
5. Flatwork around buildings	
340 sq. yds. @ \$10	3,400
6. Stone walls 1' x 2' x 140' = 280 sq. ft. surface @ \$15	4,200
7. Curb 106' @ \$8.00	848
Total Cost of Buildings	\$31,681
B. Furnishings	
1. Signs - Plastic on Aluminum Alloy	
1-12' x 3½' = 42 sq. ft. @ \$30	\$ 1,260
3 2½' x 4' = 30 sq. ft. @ \$30	900
1-2' x 8' = 16 sq. ft. @ \$30	480
12-2½' x 4' = 120 sq. ft. @ \$30	3,600
2. Benches	
4 - 16" x 6' @ \$60 each	240
Total Furnishings	6,480
Total Visitor Center Cost	\$38,161
3. Trail 600 yds x 4' = 800 sq yds. @ \$8.00 per yd.	\$ 6,400
4. Trail Signs	
7 x 16" x 10" = 7.8' @ \$30	\$ 234
7 Pedestals @ \$15	105
Total Cost of signs	\$ 339
5. Entry Sign, Complete	350
6. Warning on premonitory signs 2@ \$60	120
7. Parking (20 vehicles) Entry drive	
667 sq. yds. @ \$6	\$ 4,000
Total Cost of Facility	\$49,370
Total Cost of 1st Priority	\$49,370
II. The Cantwell entry station (2nd Priority), will be an entirely different design and should be less expensive, however, for estimating purposes the costs should be estimated at the same.	
Total Cost of 2nd priority	\$49,370
III. Pullouts (3rd Priority)	
No. 2 Paved Parking exists	
Entry Sign, complete	\$ 350
2 Premonitory Signs 2@ \$60	120
Walkway 100' x 4' = 44.4 sq. yds. @ \$8.00	350
Sign Structure	300
Interpretative Sign 4½ x 3' = 13½ @ \$30	405
Total	\$ 1,530

No. 10. Gravel parking exists	
Sign Structure	\$ 300
Interpretative Sign	405
2 Premonitory Signs	120
Total	<u>\$ 825</u>

No. 11. Gravel parking exists	
2 Interpretative Sign.	\$ 810
2 Sign Structures	600
2 Premonitory Signs	120
Total	<u>\$ 1,530</u>

No. 14. No parking exists at present, parking - 15 autos	
500 sq. yds. @ \$6	\$ 3,000
Trail 600 yds. x 4' = 800 sq. yds. @ \$8.00 per yd.	6,400
3 Sign structures @ \$300 ea.	900
3 Interpretative @ \$405 ea.	1,215
1 Entry Sign, complete	350
2 Premonitory signs @ \$60	120
Total	<u>\$11,985</u>
Total Cost of 3rd Priority	<u>\$15,870</u>

IV. Pullouts (4th Priority)

No. 3 Parking in gravel pit	
Parking improvement - 15 autos	\$ 2,000
Entry Sign	350
Interpretative Sign	405
Sign Structure	300
2 Premonitory Signs	120
Total	<u>\$ 3,175</u>

No. 5. Parking exists	
Clean up parking	\$ 300
Trail and viewing platform	1,200
Entry sign	350
Interpretative Sign	405
Sign Structure	300
2 Premonitory Signs	120
Total	<u>\$ 2,675</u>

No. 7. Parking exists but expansion required	
Parking to 15 vehicles	\$1,500
Entry sign	350
Interpretation sign	405
Sign Structure	300
2 Premonitory signs	120
Total	<u>\$ 2,675</u>

No. 8. Parking does not exist but a good location and improvement will be easy.	
Parking 15 vehicles	\$ 2,000
Entry Sign	350
Interpretative Sign	405
Sign Structure	300
2 Premonitory Signs	120
Total	<u>\$ 3,175</u>

No. 9 Parking exists but expansion required	
Parking to 15 vehicles	\$1,500
Entry Sign	350
Interpretative Sign	405
Sign Structure	300
2 Premonitory Signs	120
Total	<u>\$2,675</u>

No. 13 No parking exists but development would be easy	
Parking 15 vehicles	\$2,500
Entry Sign	350
Interpretative Sign	405
Sign Structure	300
2 Premonitory Signs	120
Total	<u>\$3,675</u>

No. 15 No parking exists	
Parking 15 vehicles	\$3,000
Entry Sign	350
Interpretative Sign	405
Sign Structure	300
2 Premonitory Signs	120
Total	<u>\$4,175</u>

No. 16 No parking exists but development should be easy	
Parking 15 vehicles	\$2,500
Entry Sign	300
Interpretative Sign	405
Sign Structure	300
2 Premonitory Signs	120
Total	<u>\$3,675</u>

No. 17 No parking exists	
Parking 15 vehicles	\$3,000
Entry Sign	350
Interpretative Sign	405
Sign Structure	300
2 Premonitory Signs	120
Total	<u>\$ 4,175</u>
Total Cost of 4th Priority	<u>\$30,075</u>

V. Pullouts (5th Priority)

No. 4 No parking existing and a great amount of fill required.	
Parking 15 vehicles and the viewing platform	\$4,500
Entry Sign	350
Interpretative Sign	405
Sign Structure	300
2 Premonitory Signs	120
Total	<u>\$5,675</u>

No. 6 No parking existing, a great amount of fill required,
but can be secured close by.

Parking 15 vehicles	\$ 4,000
Entry Sign	350
Interpretative Sign	405
Sign Structure	300
2 Premonitory Signs	120
Total	\$ 5,175

No. 12 Parking exists and can be expanded but may require
fill material hauling

Parking 15 vehicles	\$ 3,500
Entry Sign	350
Interpretative Sign	405
Sign Structure	300
2 Premonitory Signs	120
Total	\$ 4,675
Total Cost of 5th Priority	\$15,525

VI. Premonitory signs - to inform travelers of things to see
and stops of interest ahead (not included in previous signing).

Approximately 35 @ \$60 ea. installed \$ 2,100

VII. Trails

Trail Entry Signs 9 @ \$300	\$ 2,700
Trail Information Signs 9 @ \$300	2,700
18 premonitory signs	1,080
Parking 5 - 10 cars and clean up areas 9 areas	9,000
Total	\$15,480
Total Cost of all signing and development above	\$188,140

VIII. Brochures - Highway Trails, Fishing ?

IX. Trash and roadside rubble

Cleanup, lay banks back, clean up gravel pits
\$25,000 each year for 4 years \$100,000

TOTAL COST OF PLAN \$288,140

RECOMMENDATIONS

In addition to implementing the signing, interpretive pullout and visitor information centers and pamphlet programs in their recommended priority, the investigators have made the following recommendations for consideration by the BLM.

1. Consult professional interpreters to further refine the inter-sign messages presented in the plan.
2. The entire roadway should be cleaned up.
 - large boulders and rock rubble should be removed from the road and road banks.
 - road surface maintenance should be increased to make the highway a first class graveled roadway.
 - All litter and trash should be cleaned up from along the roadway, roadside areas, and roadside gravel pits. The roadway should be kept clean.
 - All vandalized signs should be removed. Those that are unnecessary should not be replaced.

A clean, well kept area by its appearance alone helps to reduce vandalism and littering. The above recommendation and guideline should help reduce these problems.

3. Local residents should be contacted to look after and maintain the visitor information centers at each end of the highway during the off seasons when summer help is not available.

These facilities will represent a substantial investment and they should not be unattended for 7 or 8 months each year. Using locals for off season care will not only supplement incomes, but may also build a "community pride" in what the BLM has achieved along the highway.

4. A pilot project using a local resident as a living history interpreter. An example would be a program using Leroy B. "Shorty" Kercher to demonstrate gold panning and relate the colorful gold mining history of the area.
5. A pilot study, using the radio-tape technique, with transmitter, battery and tape player installed at one of the lodges along the highway. The lodge operator could be trained in the equipment operation, and general maintenance procedures.
6. The BLM should develop a system to evaluate both the plan's effectiveness and the reaction of visitors and local residents to it.
7. The BLM should develop more specialized studies of the Denali area's geology, glaciation, vegetation, wildlife, and weather to expand and improve the information and interpretive programs presented in this report.

These recommendations, if followed, should improve the plan's immediate effectiveness as well as its long range impact.

SUMMARY

The major thrust of this study has been to determine how the United States Bureau of Land Management can better serve the recreation user of the Denali Highway and at the same time preserve and protect the resource.

The studies revealed that 90 percent of the highway use is for recreation, and that these users desire more information about the area; services, natural resources, road conditions etc.

The study involved three processes; library research, field studies and interviews, and a user survey.

Library research was conducted at Colorado State University; the Alaska State Library at Juneau; the Bureau of Land Management libraries, Anchorage District Office, and the Alaska State office; the United States Forest Service, Alaska Planning Team; the National Park Service, Alaska; and the National Park Service Planning Office, Denver, Colorado.

Field studies involved spending time in the area during heavy recreation use months June and July, touring the area with specialists in recreation from the U. S. Bureau of Land Management and the University of Alaska. Time was also taken with a geologist and archaeologist employed by the Bureau of Land Management and an archaeologist from the Aleyeska Company which is constructing the Alaska pipeline. Information was sought from experts at Colorado State University in geology, vegetation, and wildlife. Countless others were consulted with regard to natural resources, history, archaeology and recreation. Residents along the highway at Paxson and Cantwell were interviewed to obtain their opinions regarding their own use and needs along the highway as well as the public's needs.

Information was secured from a survey conducted by the University of Alaska. This information applied very well to the needs of this study.

This plan has been designed while following the goals and objectives established at the outset of the planning program. The researchers feel that the objectives have been met and that this plan forms a solid base for immediate improvements. They are also of the opinion that this provides a good base for future and more detailed planning for this exceptional area.

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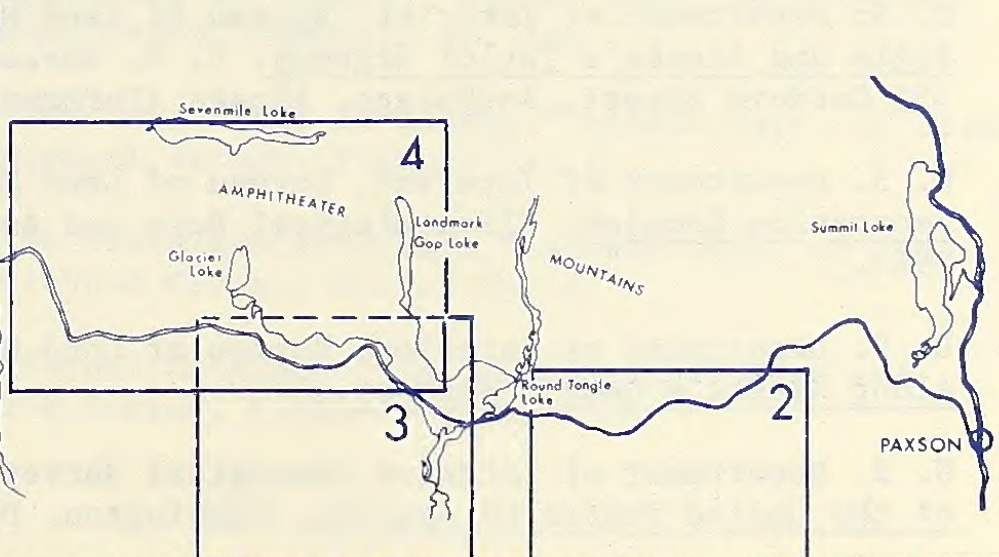
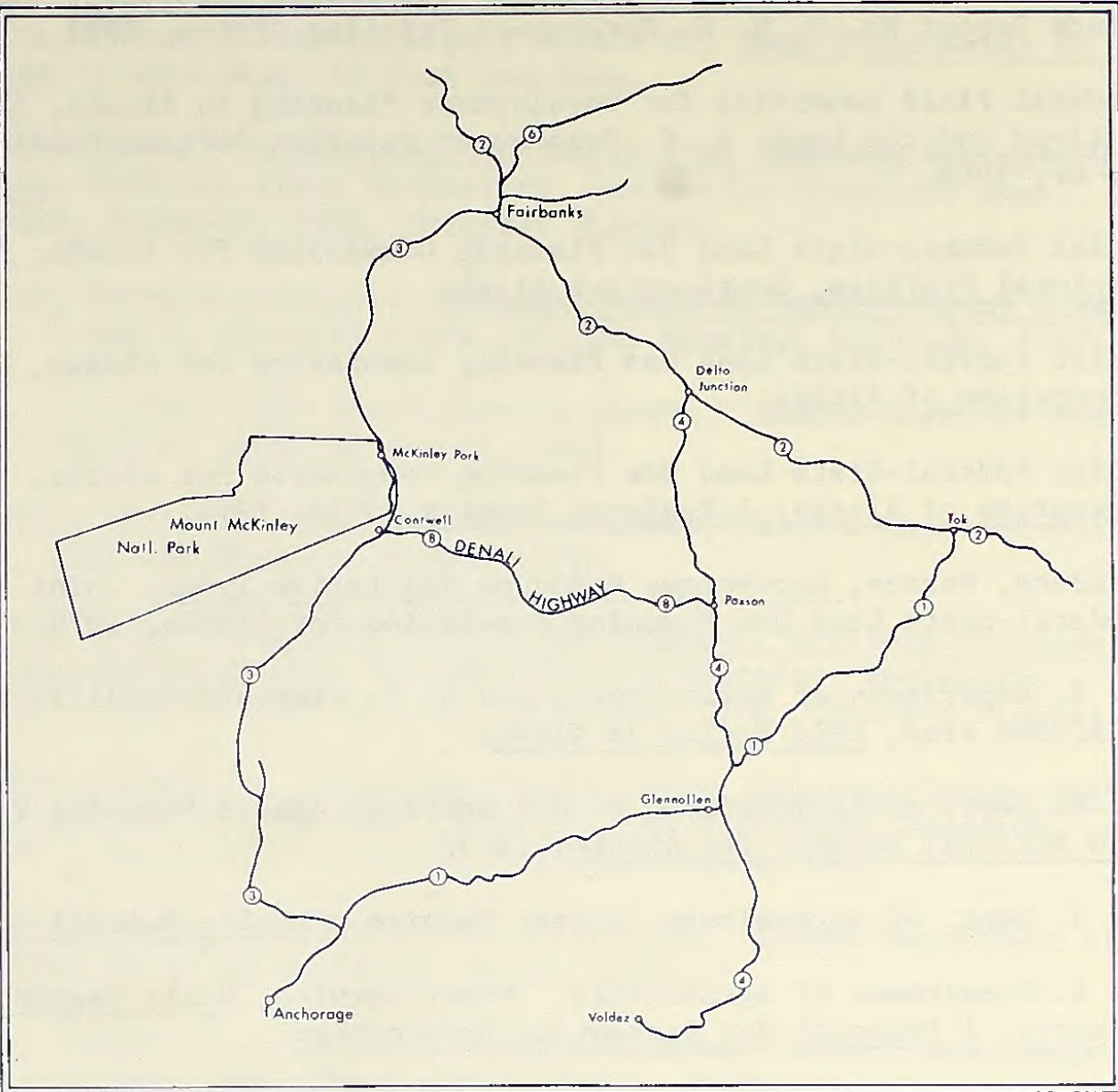
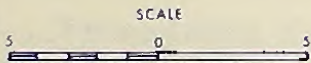
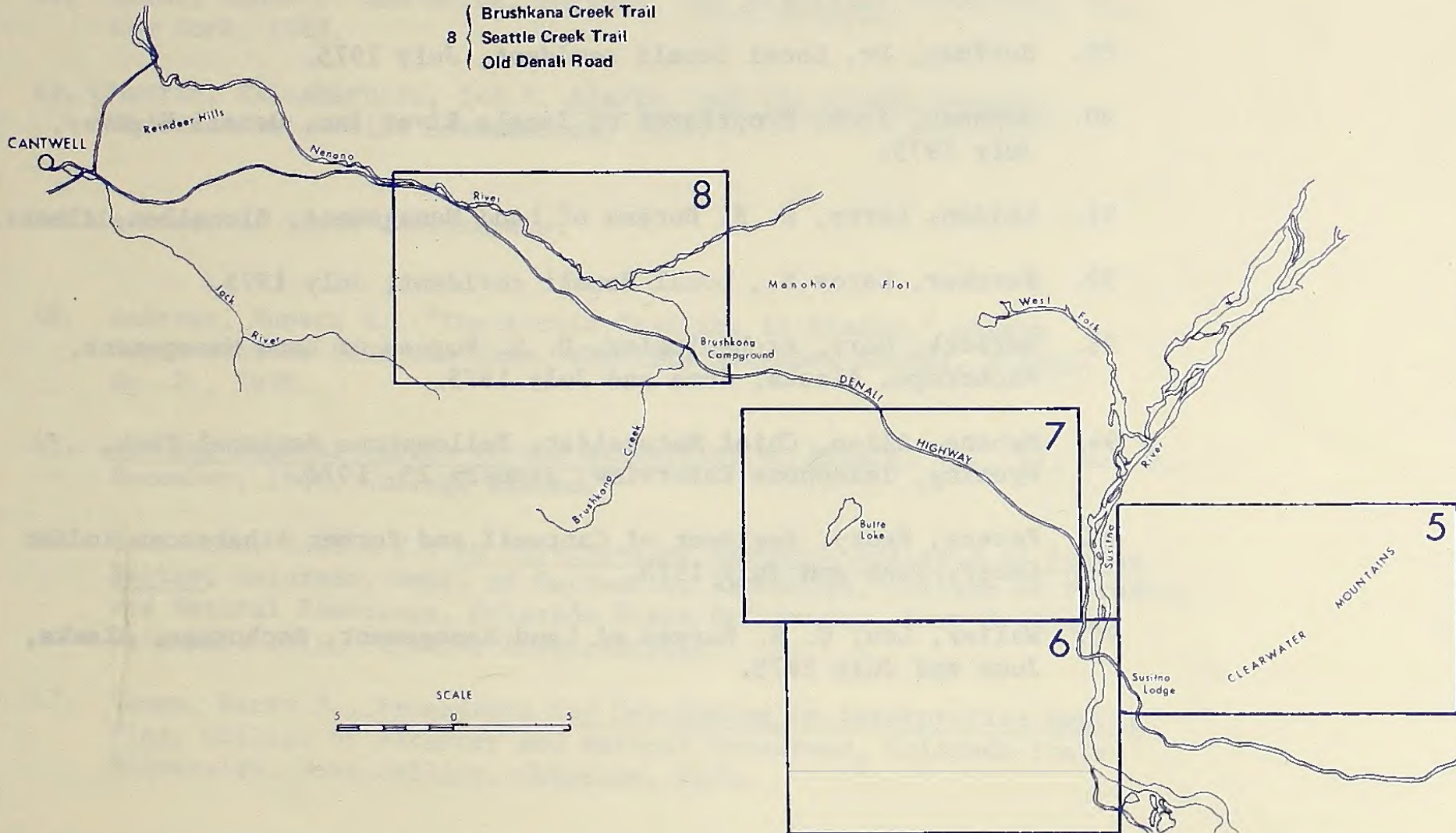
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DENALI HIGHWAY

TRAIL MAP LOCATIONS




- 1 { Delta River Canoe Trail
Tangle Lake from the Falls Trail (proposed)
Pioneer Access Road Trail
- 2 { Swede Lake Trail
Little Swede Lake Trail
- 3 { Upper Tangle Lakes to Dickey Lake Trail
- 4 { Lendmark Gap Trail
Sevenmile Lake Trail (proposed)
Glacier Lake Trail
Boulder Creek Trail
- 5 { Denali Loop Trail
- 6 { Butte Creek Trail
Upper Trail
Lower Trail
Snodgrass Lake Trail
Reclamation Trail
- 7 { Butte Lake Trail
- 8 { Brushkana Creek Trail
Seattle Creek Trail
Old Denali Road

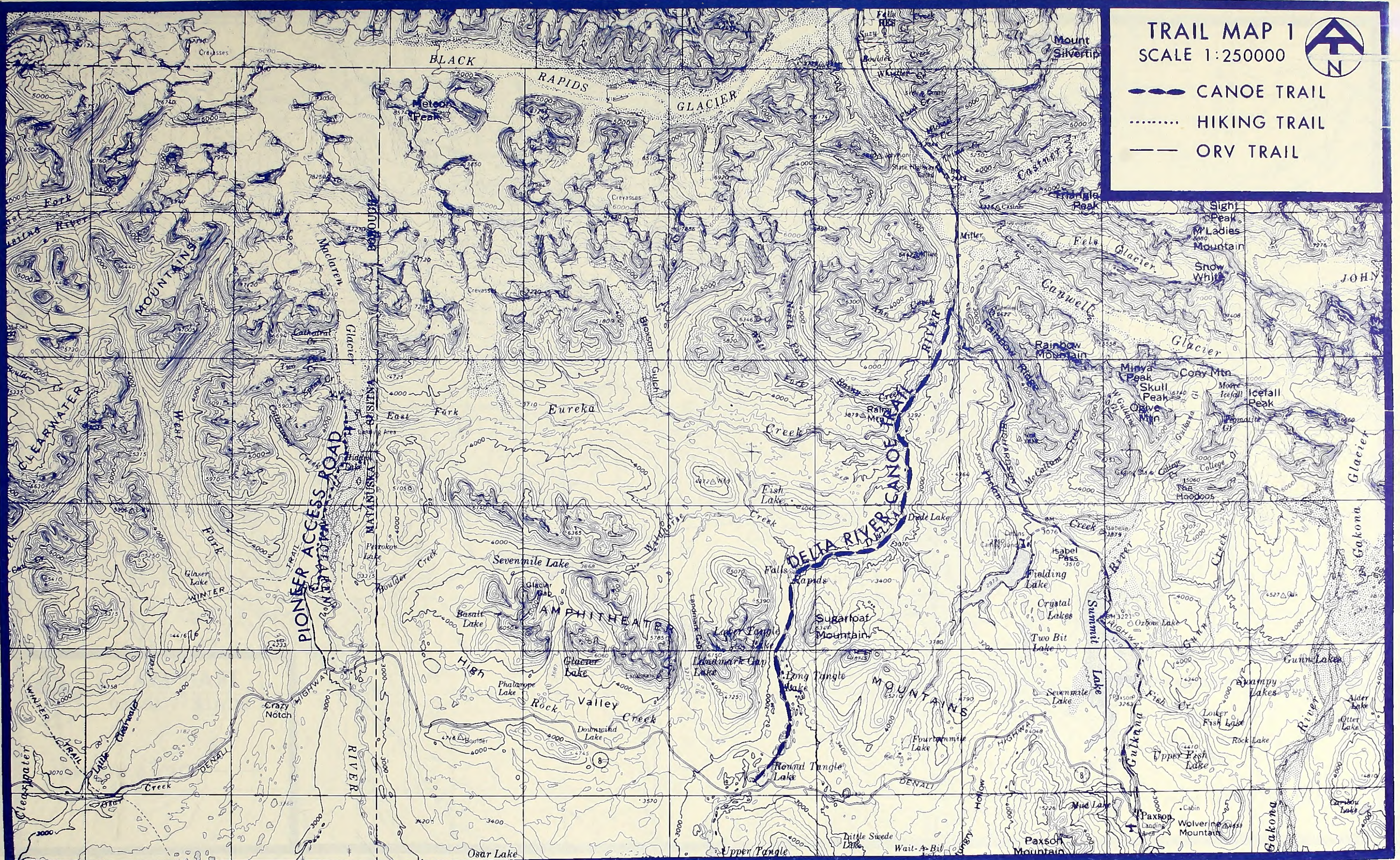


TRAIL MAP 1

SCALE 1:250000

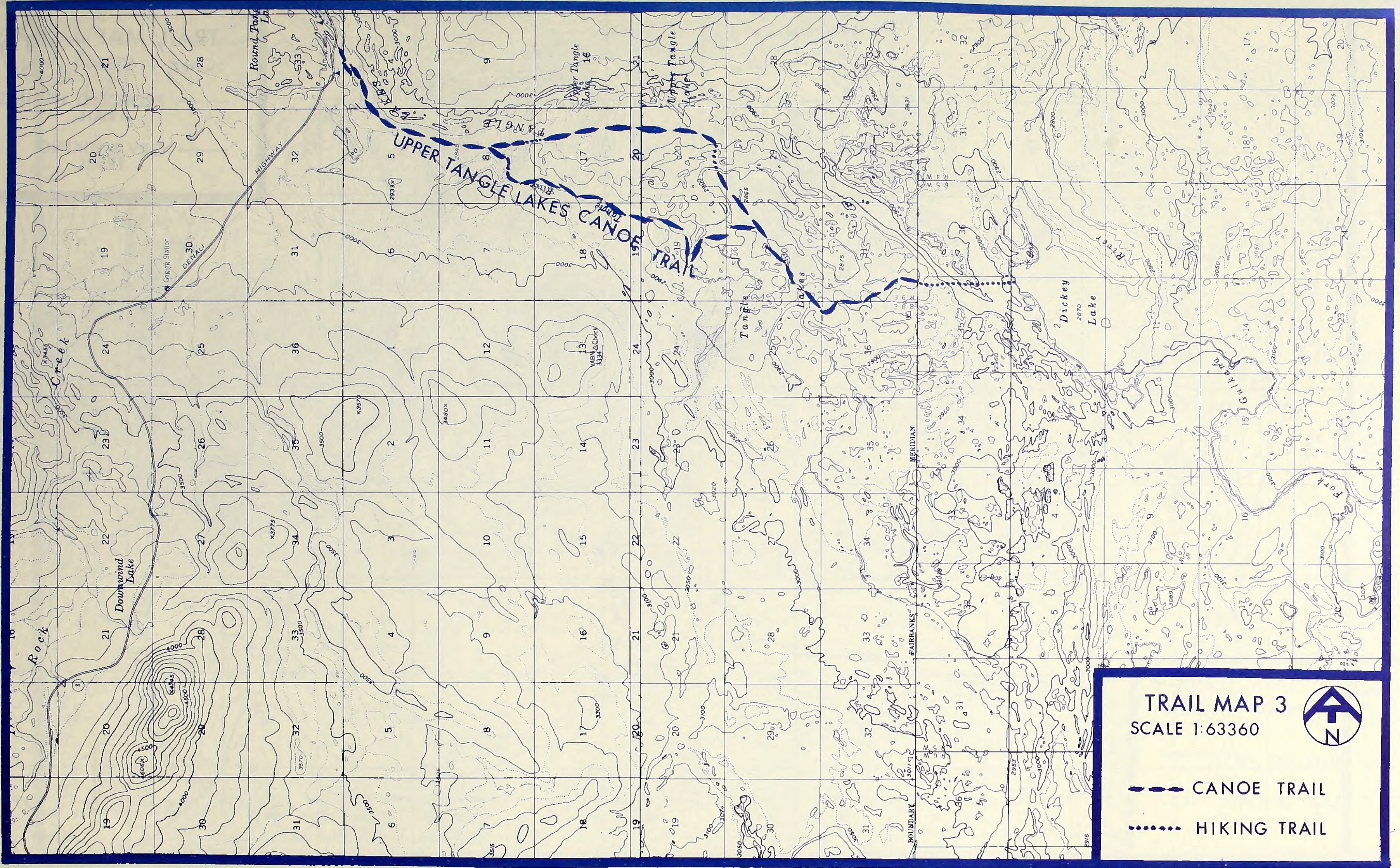


-  CANOE TRAIL
-  HIKING TRAIL
-  ORV TRAIL



MAP 11

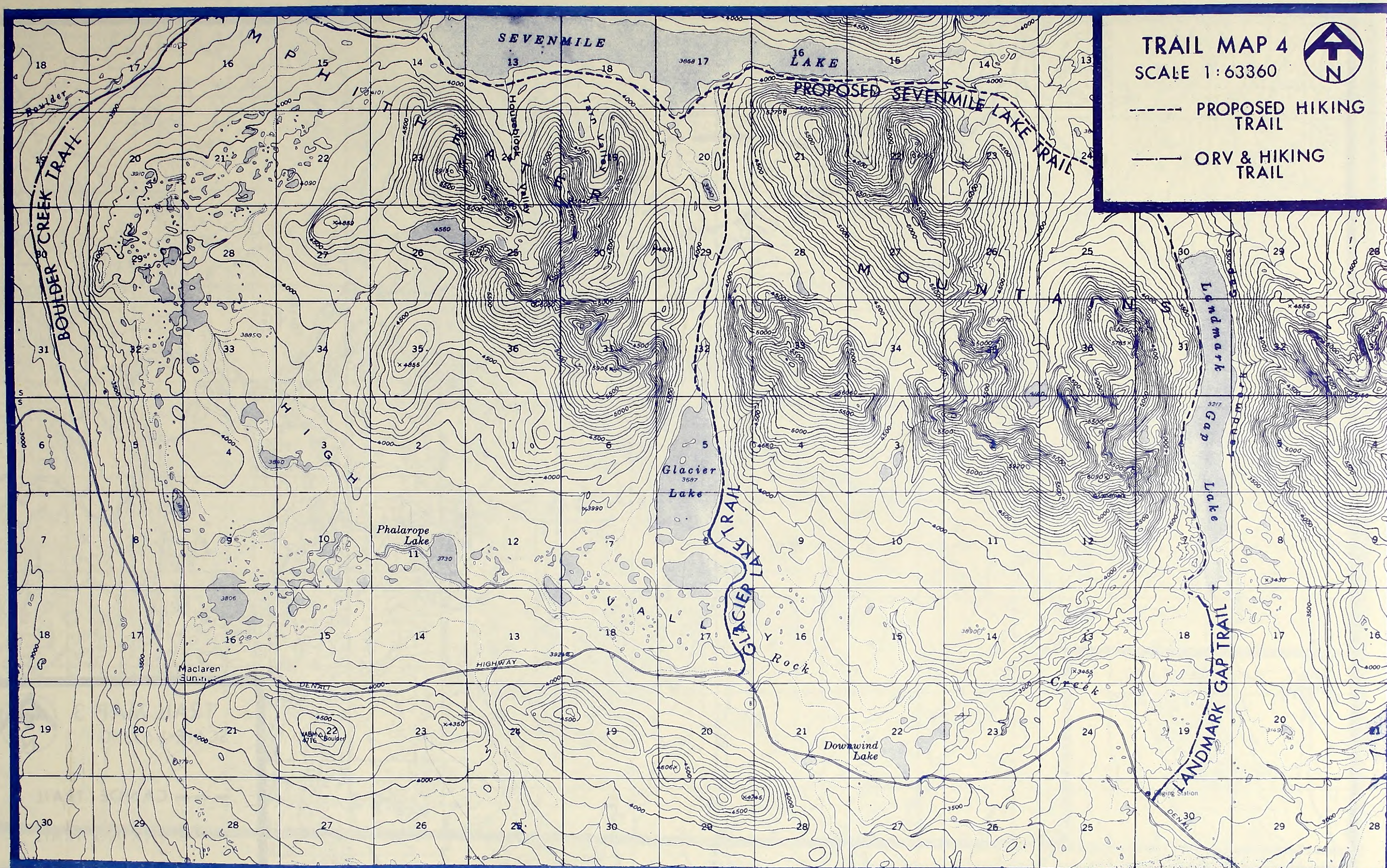
— — ORV & HIKING
TRAIL

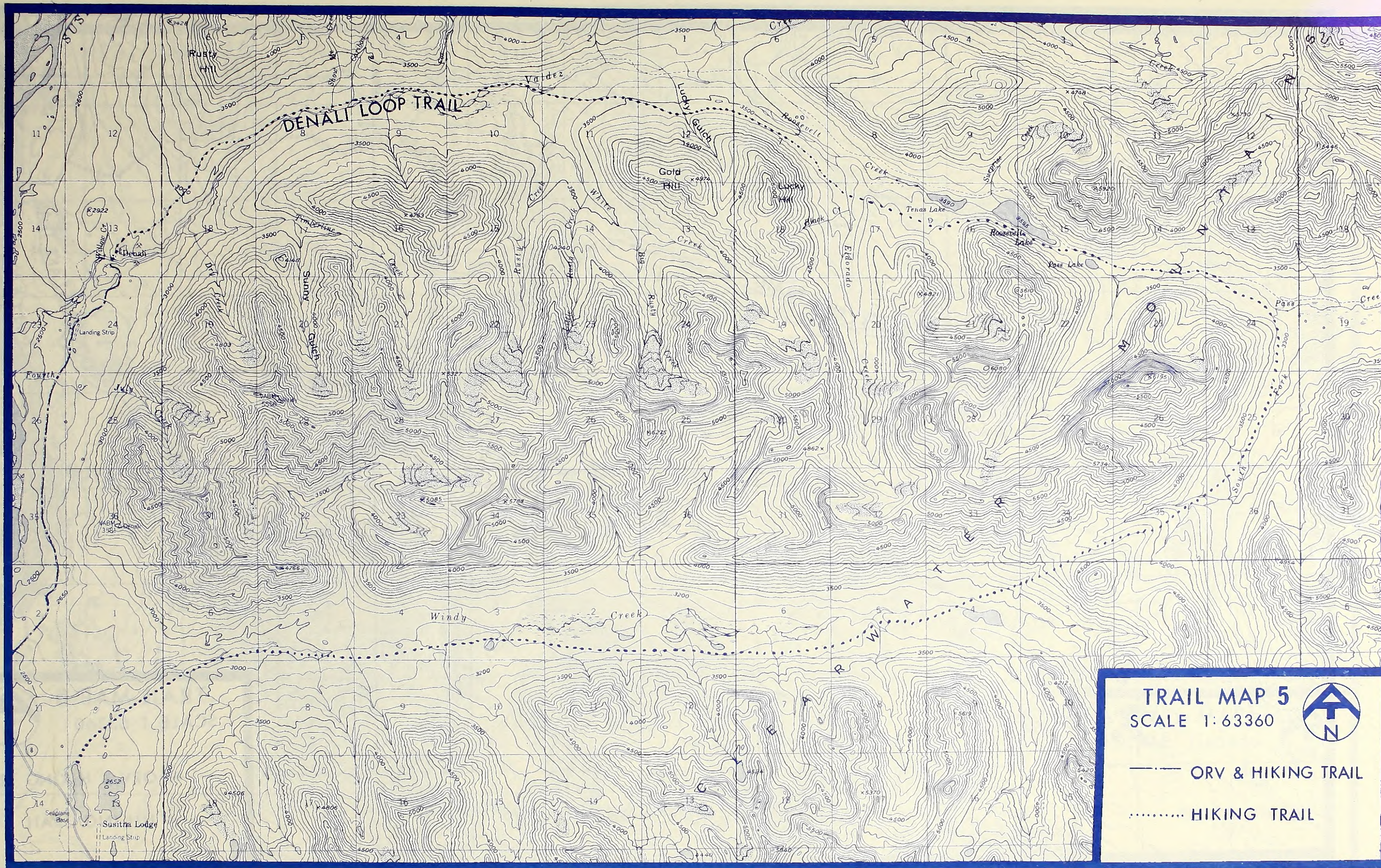


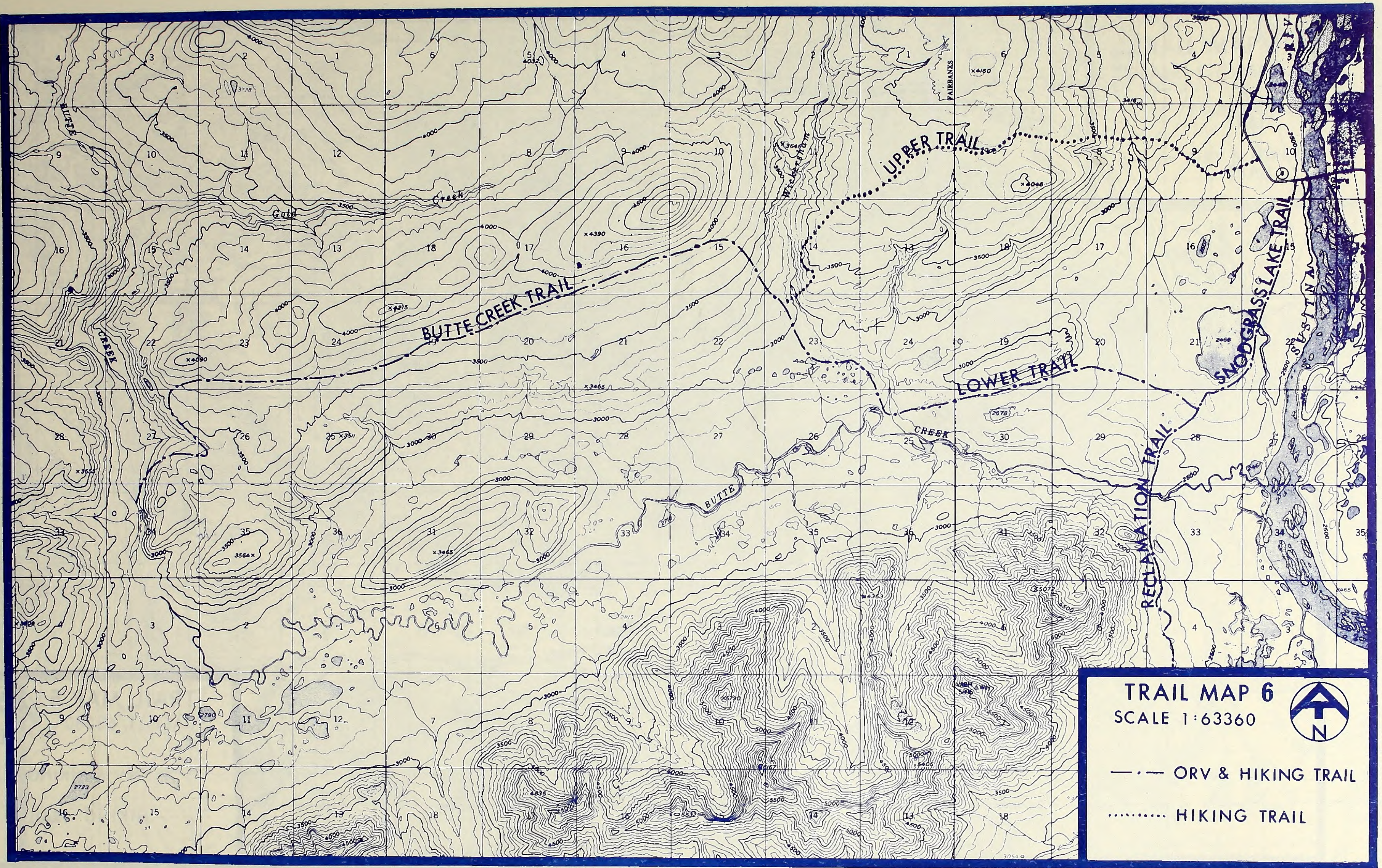
TRAIL MAP 3
SCALE 1:63360



--- CANOE TRAIL
..... HIKING TRAIL





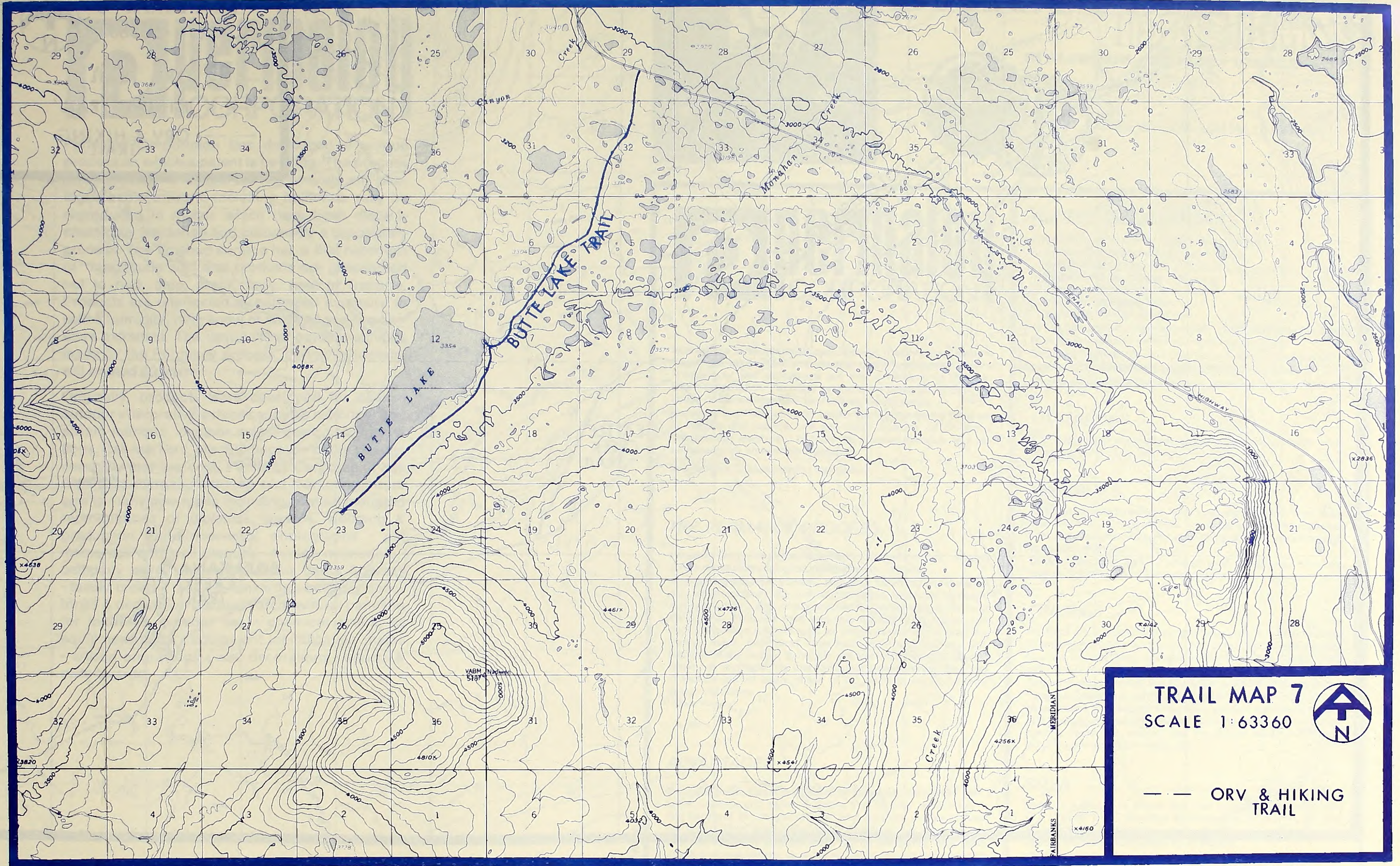


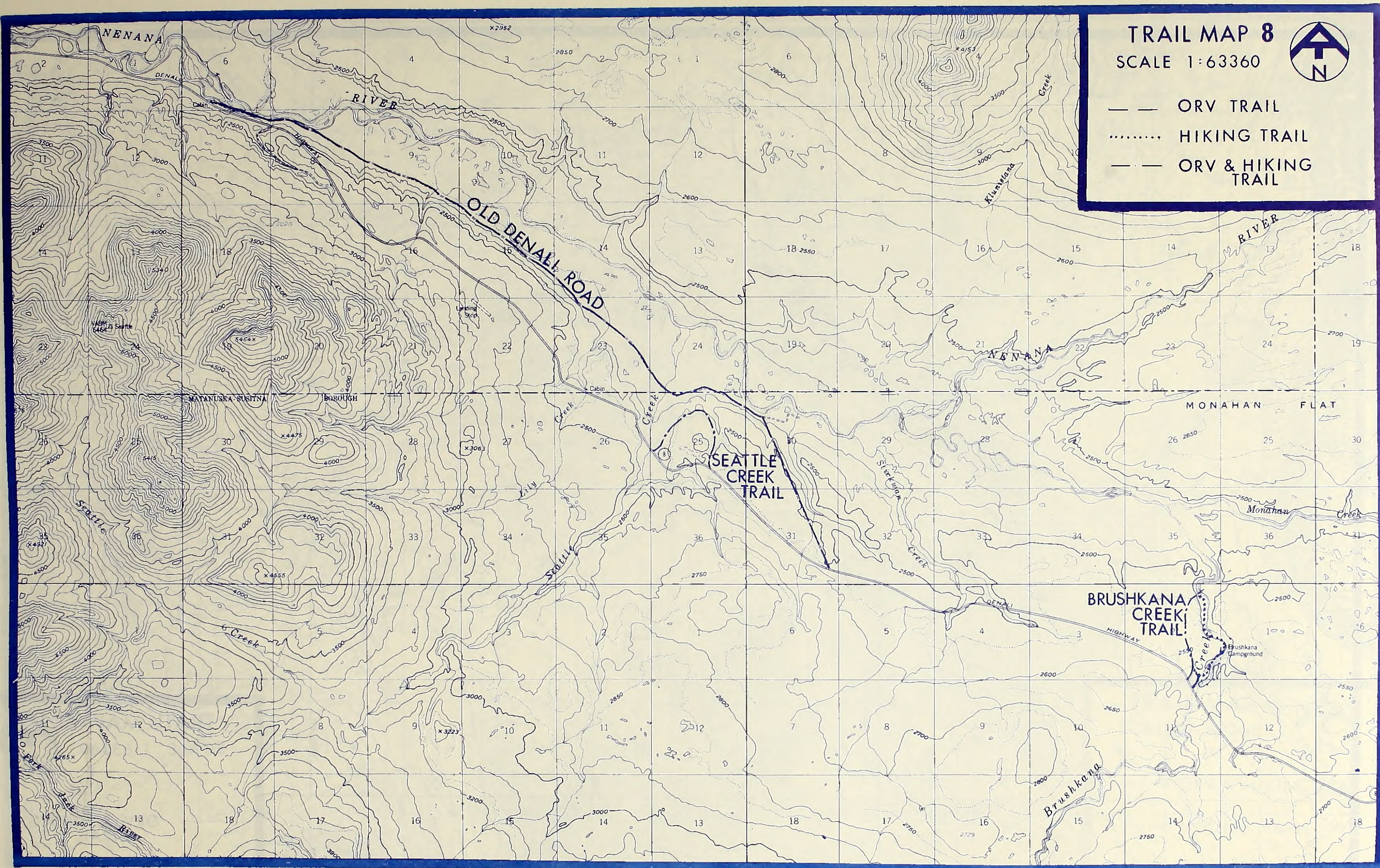
TRAIL MAP 6
 SCALE 1:63360



— · — ORV & HIKING TRAIL

..... HIKING TRAIL







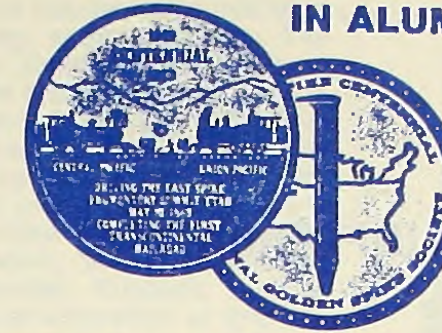
Permaloy Corporation has developed a unique process on which a patent is pending. The process involves photo-chemical etching wherein any photographable artwork, including halftones, may be reproduced in metals which have been electrochemically hardened and colored by a proprietary process. The finished surface has a flint hardness of "magnitude six" and products are guaranteed not to rust, chip, crack, fade, peel or fracture. Products are unaffected by extended exposure to saline humidity, rain, snow or sunlight and temperature extremes. The useful life of outdoor exhibits made by the Permaloy process, barring vandalism, will exceed 50 years.

Originally, products were developed for use as outdoor interpretive exhibits such as historical and scenic markers, contour maps, geological formations, trail markers, etc. But because of the beauty, durability and low cost, Permaloy Corporation has expanded its manufacturing and marketing structure to many new areas including • walnut mounted reproductions of diplomas, awards, wedding & graduation announcements, photographs • pet memorials and wall plaques • human memorials • company signs • name plates for desks & doors • family crests • mugs & tankards • building directories & dedication plaques • architectural paneling for indoor & outdoor use • chemical milling of equipment parts • equipment identification plates • artistic engravings • wall decorations • sports & civic awards.



PLAQUES SIGNS DIRECTORIES DESIGNS

IN ALUMINUM • BRONZE • STAINLESS STEEL



"NEW IDEAS IN ALUMINUM"



Innovations in aluminum! A new concept in architectural design! Space age alloys—uncompromising quality—unequaled service—know-how and experience are the cornerstone of PERMALOY™ Corporation. Permaloy products are designed to meet the needs of the architectural and interior design fields.

Research and Development, based upon a continuing program to improve and provide new and better products, which allows the flexibility necessary to fulfill the diverse demands and requirements of architectural graphics.

Imagination + Aluminum = Permaloy

THE PERMALOY PROCESS

Permaloy Corporation has developed a unique process* offering a new dimension in graphic representation in metals.

Any photographable artwork, including half-tone photographs, may be photochemically etched into metals, which are hardened and colored by a proprietary process for perfect reproductions of the original. Products were originally developed for use as outdoor interpretive exhibits such as historical and scenic markers, contour maps, geological formations, and travel markers. But, because of the beauty, durability and low cost, Permaloy Corporation has expanded its manufacturing and marketing structure to include almost every phase of the architectural and interior design industries.

*Patent Pending

ADVANTAGES

Permaloy products are unaffected by temperature extremes, rain, snow, sunlight and saline humidity. The finished surface has a flint hardness of "magnitude six" and products are guaranteed not to rust, chip, crack, fade, peel or fracture.

With the Permaloy process there are no limitations, other than space and imagination, as to the amount of design and copy that may be placed on any one plaque. And this is generally at no increase in cost.

RECENT INSTALLATIONS

Department of the Interior: (Interpretive Exhibits)

Golden Spike National Monument — Utah

Yellowstone National Park — Wyoming

Sagamore Historical Site — New York

Canyonlands National Park — Utah

LBJ National Park — Texas

Allegheny Portage — New York

AFCO Corporation — Sherwood Hills — Utah (Identification Sign)

Utah State University — Utah (Campus Identification)

Salt Lake City Salt Palace — Utah (Door & Room Identification)

Humboldt National Forest — Nevada (Interpretive Exhibits)

Wyoming Recreation Commission — Wyoming (Historic Plaques)

LIMITATIONS

The designer's imagination is the only limiting factor when choosing a Permaloy product.

MATERIALS

Products are manufactured from specially prepared high corrosion resisting aluminum alloys which are electrochemically colored and hardened, thereby enhancing weather resistant characteristics and beauty.

Other metals may also be utilized such as stainless steel and bronze. Information and details provided upon request.

FINISHES

Products are available in Midnight Bronze (dark brown), Autumn Bronze, Light Bronze and Black, with details and lettering etched in silver or gold. Also, available in Gold or Silver backgrounds, with details and lettering etched in dark bronze or black.

Special combinations of the above are available upon request.

Tests performed on the Permaloy finish exhibited only minimal deterioration after exposure to severe weather conditions equivalent to 45-50 years (high salt and humidity content of the atmosphere). Tests also showed that the colors used on Permaloy products are absolutely color fast.

SIZES

Metal is available in almost any size and shape ranging from 1" x 1" to 48" x 96". Standard thicknesses of 1/16", 1/8", 1/4" and 3/8" are carried in stock.

Special sizes and thicknesses upon request.

We can process signs as large as 8' x 4' x 3/8" thick, in one piece. (Plaques on which a half-tone is to be etched are limited in size to 48" x 58".)

ORDERING INFORMATION

Sizes Available

Standard sizes of metal in any shape are available and range from 1 in. x 1 in. to 48 in. x 60 in. Metal is available in thicknesses of $\frac{1}{16}$ in., $\frac{1}{8}$ in., $\frac{1}{4}$ in. and $\frac{3}{8}$ in. stock. Special sizes and thicknesses may also be obtained.

Color

Plaques are available in a midnight bronze (near black), autumn bronze or light bronze backgrounds etched with silver or gold lettering and details. Also, with embossed lettering and detail in black, with silver or gold backgrounds. Special combinations available upon request.

Fastening

Plaques can be fastened to virtually any surface. Please specify tapping (for blind fastening) or drilling. They can also be bonded to most surfaces with epoxy adhesives and resins.

Ordering

To give prompt service and complete satisfaction please provide camera-ready artwork, sharp black & white lettering and detail, along with a glossy photograph, if applicable.

Creative Services

Complete layout, design, typographic, photographic and art services available at nominal cost. Contact us for estimate. We would need sketch or layout of job with dimensions noted.

Shipping Information

Plaques are packed for shipment at our plant. Shipping is express collect unless advised otherwise. Small plaques are shipped postpaid by parcel post.

Availability

Delivery is usually within thirty days from receipt of your order. To give prompt service and complete satisfaction, provide camera-ready artwork, sharp black and white lettering and detail, and a glossy (black and white) photograph where applicable.

If you desire artwork to be handled by our art department, allow an additional ten days.

Special delivery in less than thirty days available for slight additional charge.

Design Assistance

Complete layout, design, typographic, photographic and art services are available. If estimate is requested, please provide sketch and/or layout of job with all dimensions noted. All estimates are expedited promptly.

Interpretive planning and rendering available.

Price List and Samples

A sample of Permaloy product and price list will be immediately provided upon request. Please specify your basic area of interest.

To avoid delay when requesting quotations, indicate all specifications of the project including rough sketches, photographs, etc.

Maintenance

Little or no maintenance is required. Products are economical to clean if it becomes necessary. Simply wipe the surface with a damp cloth. Superficial marks can be removed with any standard household cleanser. Paste wax for added lustre and protection may be applied if desired.

Sizes

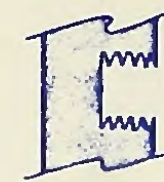
Metal is available in almost any size and shape ranging from 1" x 1" to 48" x 96". Standard thicknesses of $\frac{1}{16}$ ", $\frac{1}{8}$ ", $\frac{1}{4}$ " and $\frac{3}{8}$ " are carried in stock. Special sizes and thicknesses upon request.

We can process signs as large as 8' x 4' x $\frac{3}{8}$ " thick, in one piece. (Plaques on which a half-tone is to be etched are limited in size to 48" x 58".)

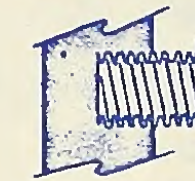
Installation

Plaques, exhibits and signs may be mounted to virtually any surface by the following methods:

Tapped Blind Mounting: Metal of $\frac{3}{8}$ " thickness may be "blind tapped" so fasteners will not show from front of plaque.



Stud Blind Mounting: Plaques of smaller thicknesses to $\frac{1}{16}$ " may also be "blind tapped" by means of a special type stud, "Perma-Fastener," from $\frac{1}{2}$ " to 3" in length.



Drilling: Specify location where holes are to be "drilled through." Decorative bolts may be used to complement the beauty of the exhibit.

Epoxy Adhesives: Most epoxy adhesives will work to insure permanent fastening. Our research and development department will assist you in determining the most suitable epoxy for your particular needs.

Double Sided Foam Tapes: Useful on smaller products where surface to be adhered to is flat and essentially even.

Specifications

Products processed under this specification shall be manufactured from highly corrosion resistant aluminum alloys. All nicks and scratches shall be removed to produce a metallurgically sound finished surface. The aluminum alloy shall then be chemically etched in a controlled inhibited etch bath, deoxidized to surface resistance of less than 5 micro ohms and immediately transferred to an anodic treatment bath. Next, the alloy shall be subjected to a controlled electro-chemical treatment such that an integrally colored hard corrosion resistant surface is produced. The metal, as removed from this bath, shall be colored various shades of bronze or black, as specified, and the hard colored aluminum oxide surface so produced shall have a minimum thickness of 0.0008 inches. The above prepared alloy shall then be coated with a light sensitive resistant photo-polymer, exposed with a positive or negative of the desired image, half-tone and/or inscription, developed and finally, chemically milled so as to leave a permanent record in the metal. The chemical milled areas shall be anodized in accordance with Military Specification MIL-A-8625, Type III, Class 1 or 2. When Class 2 is specified, the anodic film shall be dyed to produce a gold colored, sun fast, inorganic pigment within the anodic film. The completed exhibit shall be capable of withstanding year-round weathering and the colored coatings shall show no fading, flaking or chipping over a 25 year period, excluding vandalism or improper handling.

This catalog is located in the Architectural File, Section 10.14/Per, and the Interior Design File, Section A6 Graphics & Signs, of the Sweet's 1973 Catalog Files.

Allegheny Portage Railroad Engine House

In front of you are the excavated foundations of the engine house for Incline 6 which stood here astride the tracks leading up from the Skew Arch Bridge below. One 35 horsepower steam engine raised and lowered the portage railroad cars by means of a continuous rope moving from the engine house, down one track and up the other; a second engine was available in case of breakdown. To ease the load on the engine the operators tried to equalize the weight of the ascending and descending cars.

A similar installation was located at each of the ten inclined planes on the Portage Railroad.



The engine house for Incline 6 stood near the highest point on the Portage Railroad.



Cross section of the engine house.

Our unique process enables us to etch any photographable artwork into metal to produce accurate reproductions of contrasting black & white photographs and line drawings.

Specifications

Products processed under this specification shall be manufactured from highly corrosion resistant aluminum alloys. All nicks and scratches shall be removed to produce a metallurgically sound finished surface. The aluminum alloy shall then be chemically etched in a controlled inhibited etch bath, deoxidized to surface resistance of less than 5 micro ohms and immediately transferred to an anodic treatment bath. Next, the alloy shall be subjected to a controlled electro-chemical treatment such that an integrally colored hard corrosion resistant surface is produced. The metal, as removed from this bath, shall be colored various shades of bronze or black, as specified, and the hard colored aluminum oxide surface so produced shall have a minimum thickness of 0.0008 inches. The above prepared alloy shall then be coated with a light sensitive resistant photo-polymer, exposed with a positive or negative of the desired image, half-tone and/or inscription, developed and finally, chemically milled so as to leave a permanent record in the metal. The chemical milled areas shall be anodized in accordance with Military Specification MIL-A-8625, Type III, Class 1 or 2. When Class 2 is specified, the anodic film shall be dyed to produce a gold colored, sun fast, inorganic pigment within the anodic film. The completed exhibit shall be capable of withstanding year-round weathering and the colored coatings shall show no fading, flaking or chipping over a ten year period, excluding vandalism or improper handling.

Installation

Plaques, exhibits and signs may be mounted to virtually any surface by the following methods:

Blind Mounting (Tapped): Metal of $\frac{3}{8}$ " thickness may be "blind tapped" so fasteners will not show from front of plaque.

Blind Mounting (Stud): Plaques of smaller thicknesses to $\frac{1}{16}$ " may also be "blind tapped" by means of a special type stud, "Perma Fastener," from $\frac{1}{2}$ " to 3" in length.

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Double Sided Foam Tapes: Useful on smaller products where surface to be adhered to is flat and essentially even.

Maintenance

Little or no maintenance is required. Products are economical to clean if it becomes necessary. Simply wipe the surface with a damp cloth. Superficial marks can be removed with any standard household cleanser. Paste wax for added lustre and protection may be applied if desired.

Warranty

Permaloy products are manufactured from a perpetual lasting, space age alloy. The impurities are so controlled as to assure a highly corrosion resisting product which will retain its inherent durability and beauty over the decades. These exquisite products are guaranteed not to rust, chip, crack, fade, peel or fracture and are unaffected by extended exposure to saline humidity, rain, snow, smog, sunlight or temperature extremes. Products are not guaranteed against vandalism or improper handling.

Availability

Delivery is usually within three weeks from receipt of your order. To give prompt service and complete satisfaction, provide camera-ready artwork, sharp black and white lettering and detail, and a glossy (black and white) photograph where applicable.

If you desire artwork to be handled by our art department, allow an additional ten days.

Special delivery in less than three weeks available for slight additional charge.

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Complete layout, design, typographic, photographic and art services are available. If estimate is requested, please provide sketch and/or layout of job with all dimensions noted. All estimates are expedited promptly.

Interpretive planning and rendering available.

Price List and Samples

A sample of Permaloy product and price list will be immediately provided upon request. Please specify your basic area of interest.

To avoid delay when requesting quotations, indicate all specifications of the project including rough sketches, photographs, etc.

This catalog is located in the Architectural File, Section 10.14/Per, and the Interior Design File, Section A6 Graphics & Signs, of the Sweet's 1972 Catalog Files.



specialty designs

Children's photographs, school and fraternity emblems, company logos, state and university seals, etc., can be etched into plaques or beautifully colored mugs and tankards.

The Permaloy process is ideally suited for certificates and all types of civic and industrial recognition awards where either photographs, line drawings or straight copy is desired. Other Permaloy products include walnut mounted reproductions of diplomas, awards, wedding announcements, graduation announcements, human memorials, pet markers and plaques, architectural paneling, equipment panels, as well as many other products where lasting beauty and durability are requirements.

Front Cover (Photographs)

(Left) This handsome dedication plaque was processed for Utah State University's Health, Education, and Recreation Building. It incorporates halftone in the photo and line art in the plaque, all etched into a single piece of aluminum (48" x 36" x $\frac{3}{16}$ ").

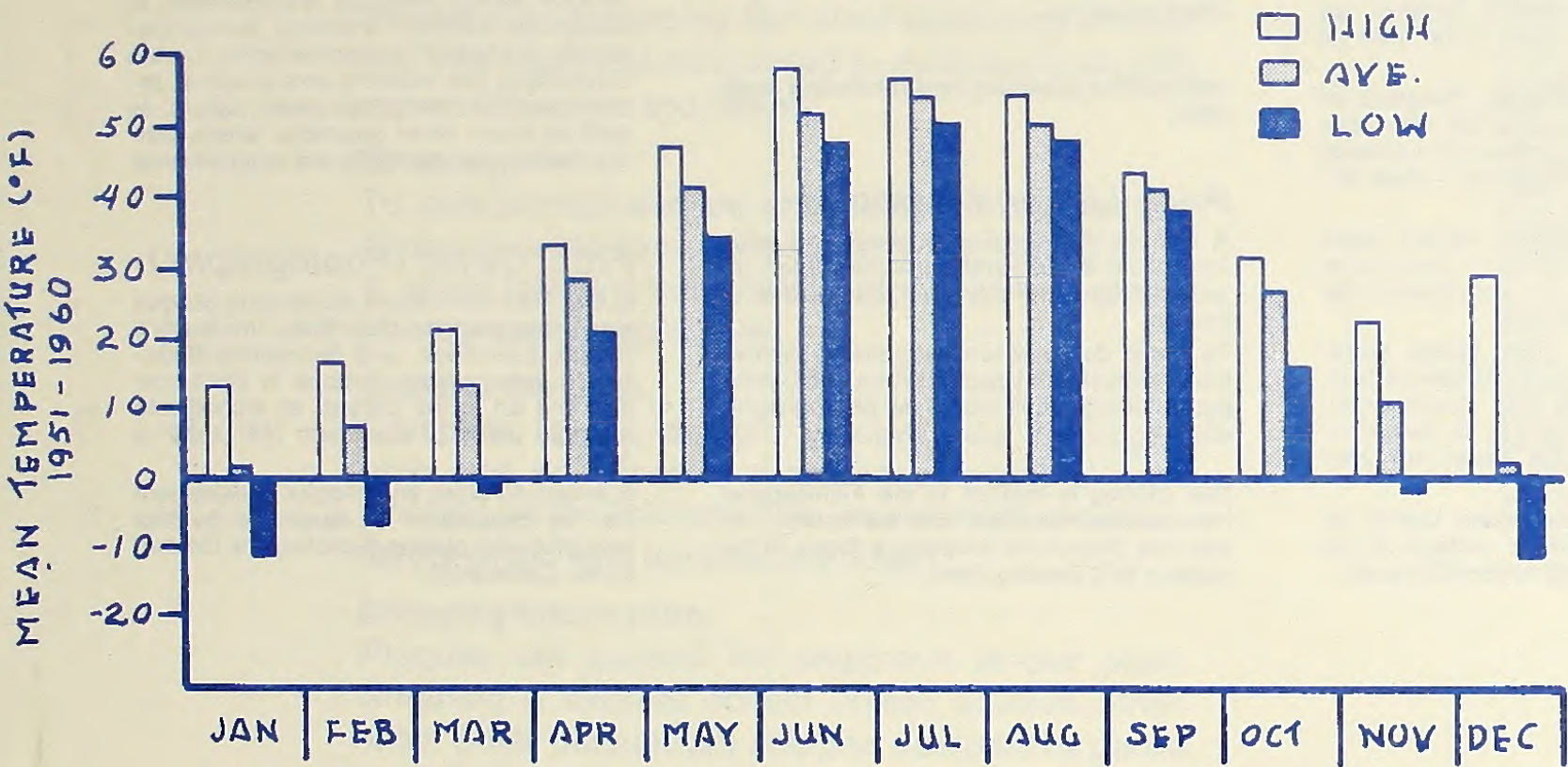
(Center) All sizes and shapes of aluminum can be processed as illustrated by this beautiful wall plaque depicting the Golden Spike Centennial.



PERMALOY CORPORATION
2861 SOUTH 1100 WEST • OGDEN • UTAH • 84402
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"ALUMINUM FOREVER"

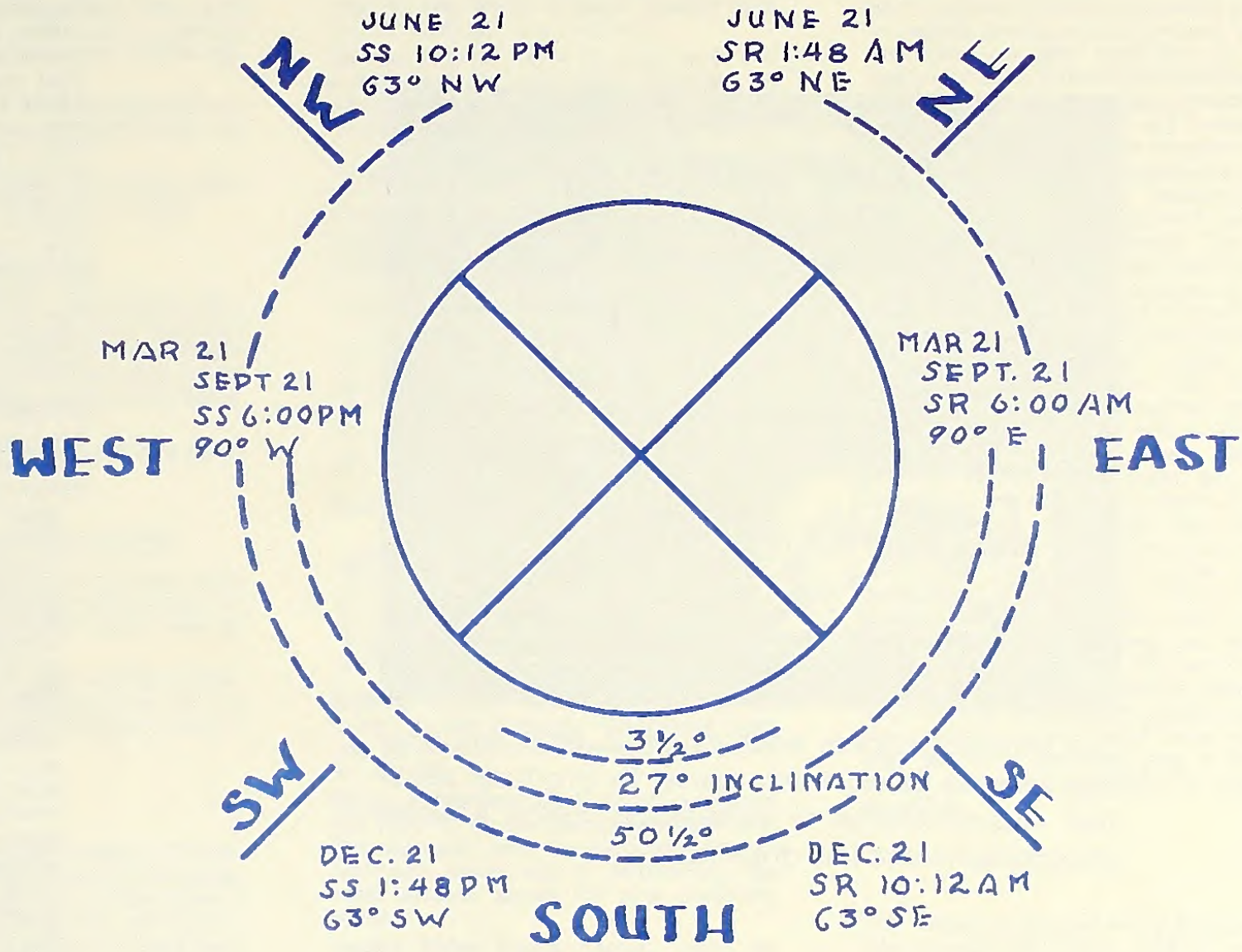
Mt. MCKINLEY TEMPERATURE DATA



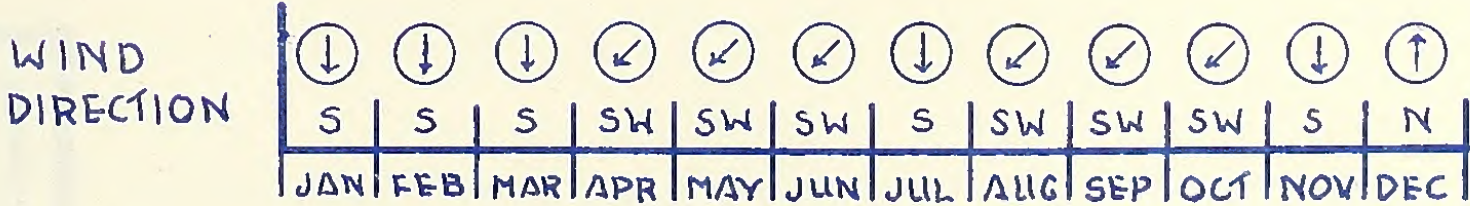
AVERAGE NORMAL MEAN TEMPERATURE IS 27.4° F BASED UPON 34 YEARS
SOURCE: U.S. DEPT. OF COMMERCE NATIONAL WEATHER SER.

DENALI HIGHWAY

SUN MOVEMENT
NORTH

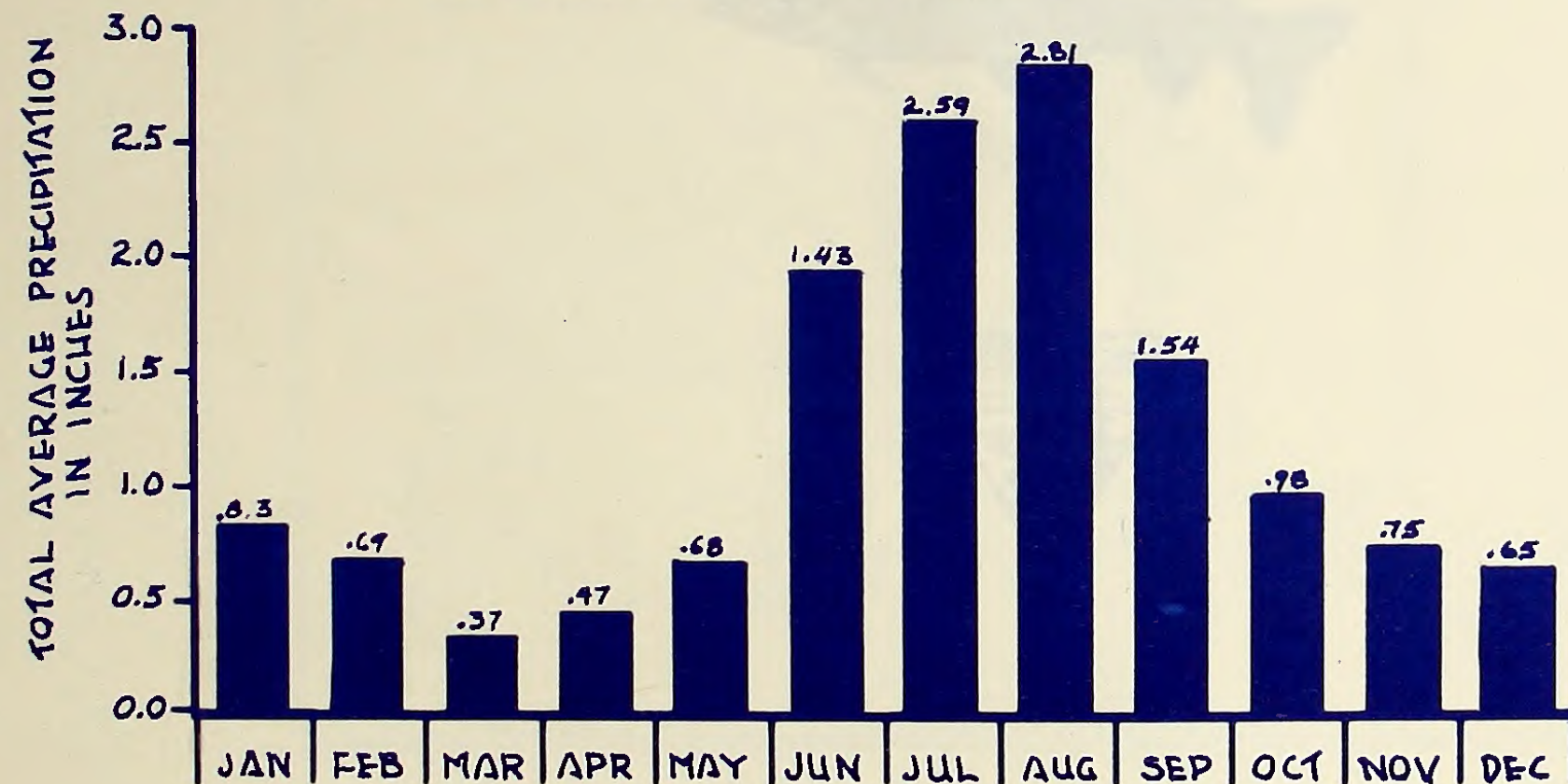


WIND DIRECTION
MCKINLEY PARK



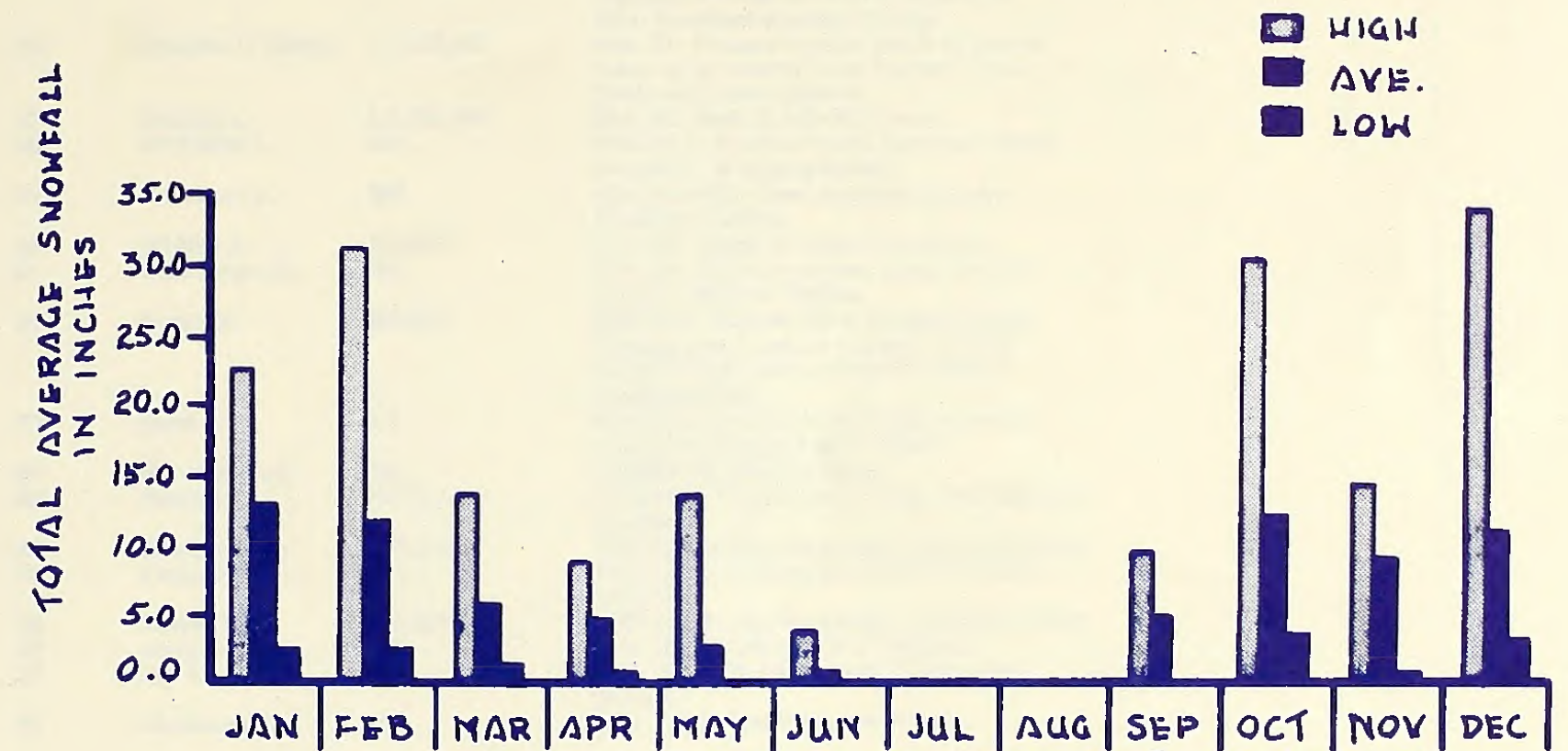
DENALI
HIGHWAY
FISHING
AREAS

MT. MCKINLEY PRECIPITATION DATA



SOURCE: U.S. DEPT. OF COMMERCE
NATIONAL WEATHER SER.

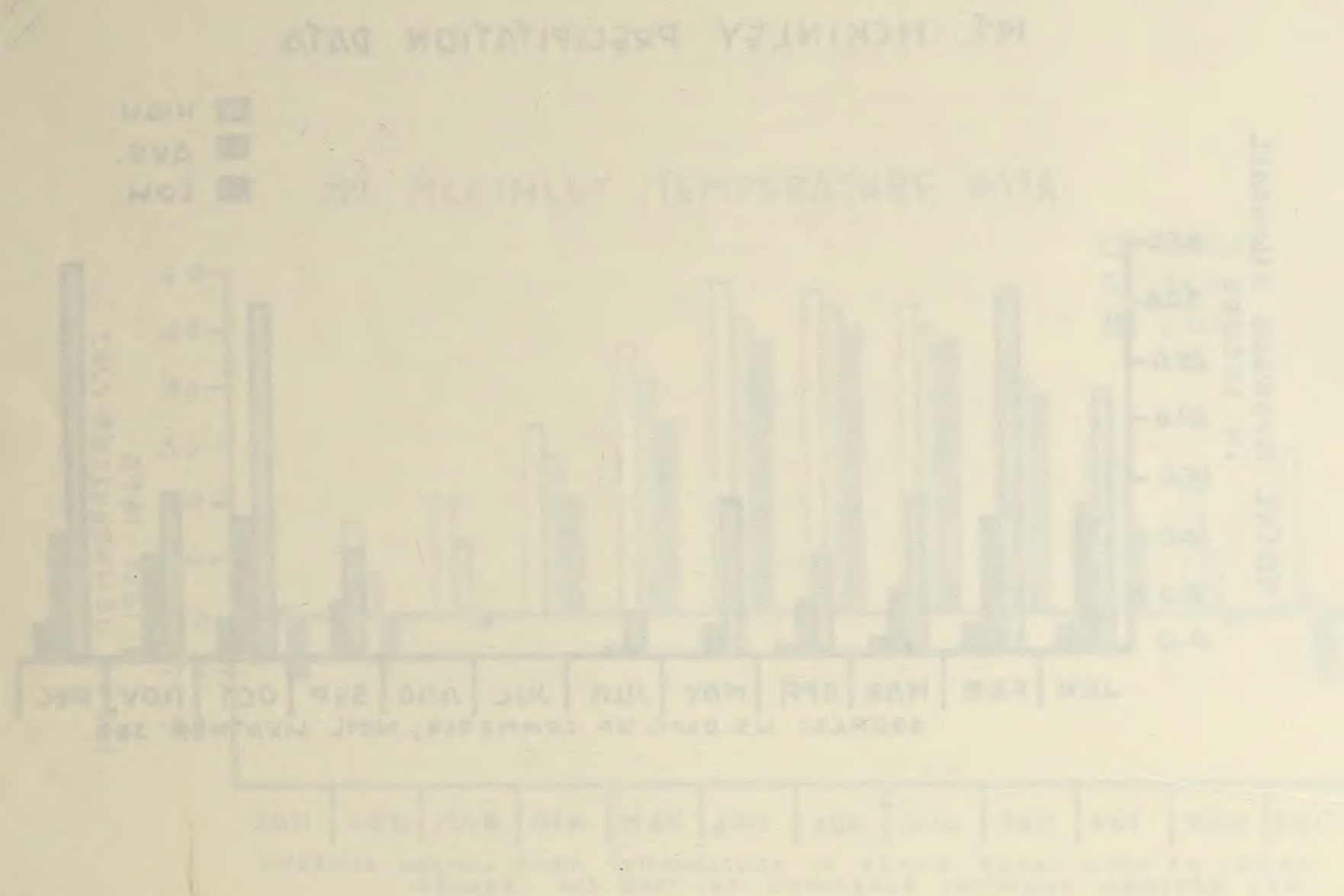
MT. MCKINLEY PRECIPITATION DATA



SOURCE: U.S. DEPT. OF COMMERCE, NATL WEATHER SER.

APPENDIX D

Fishing and Trails Pamphlets



DENALI HIGHWAY FISHING AREAS



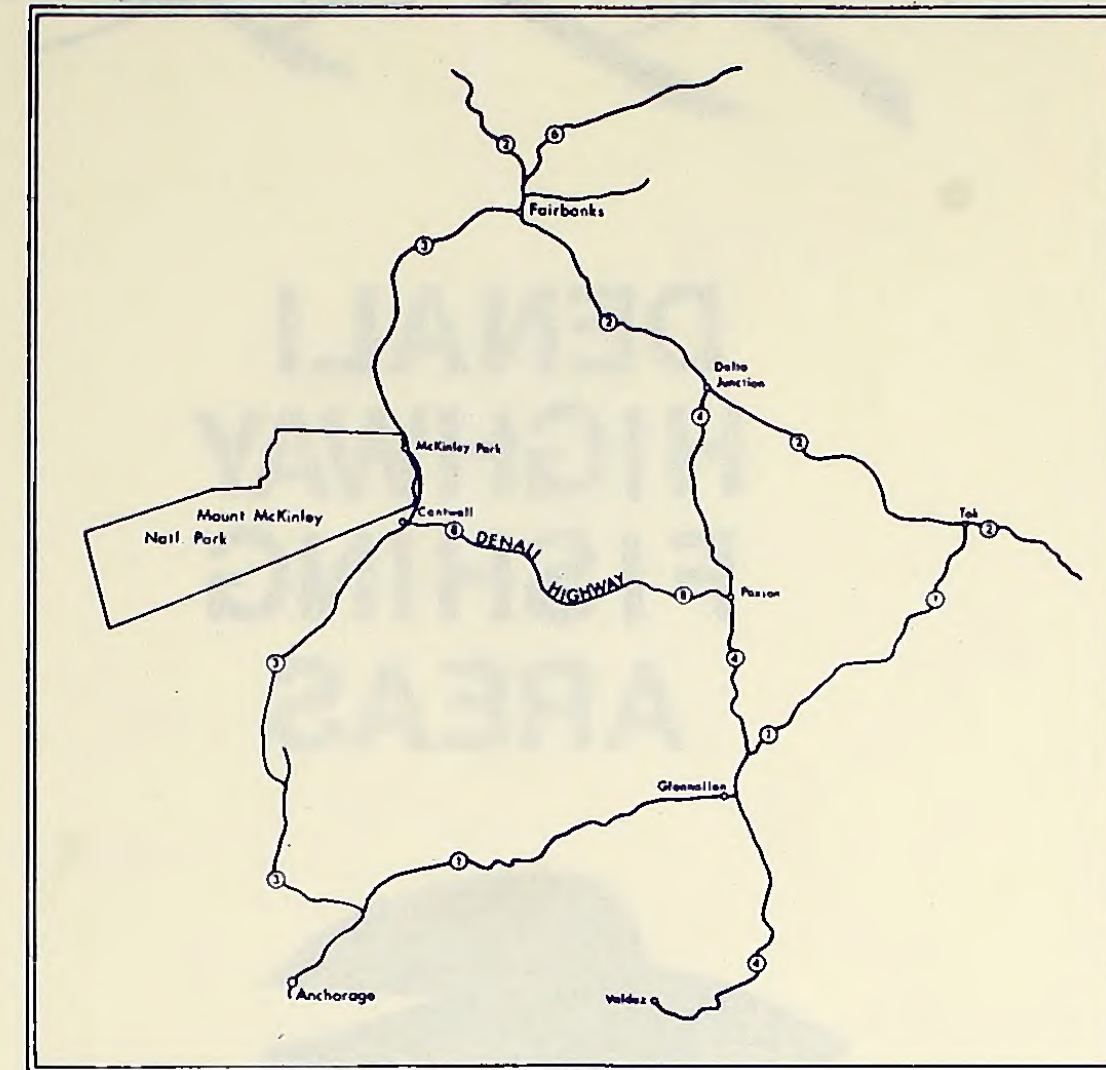
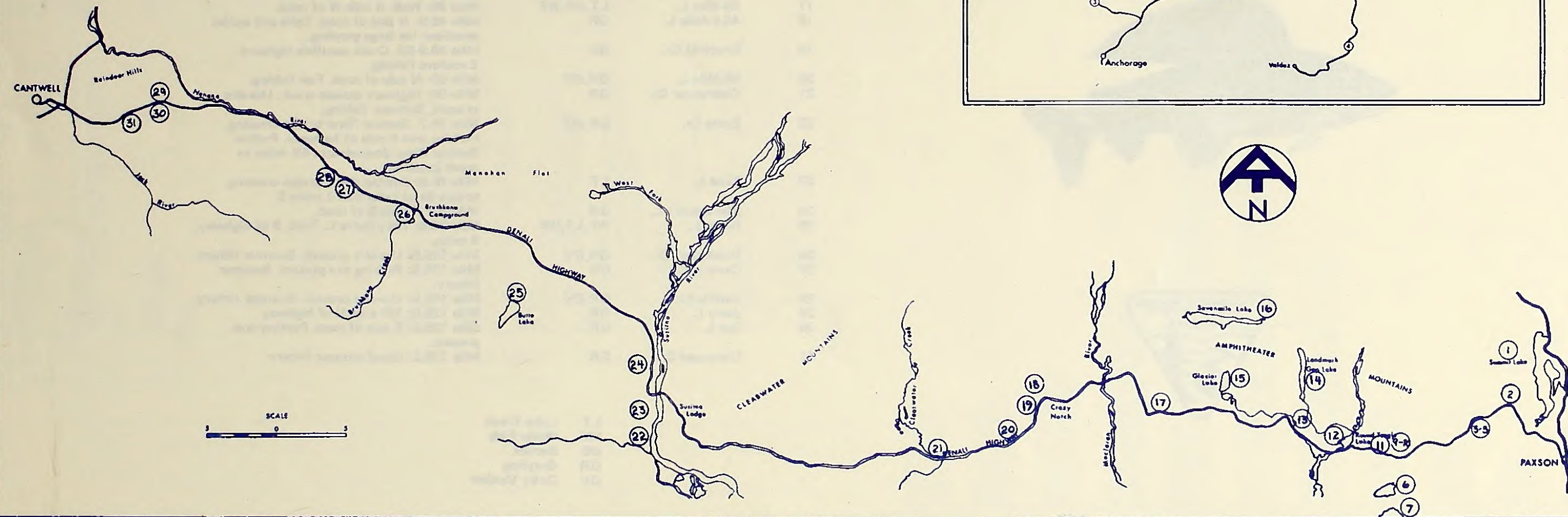
FISHING LOCATIONS

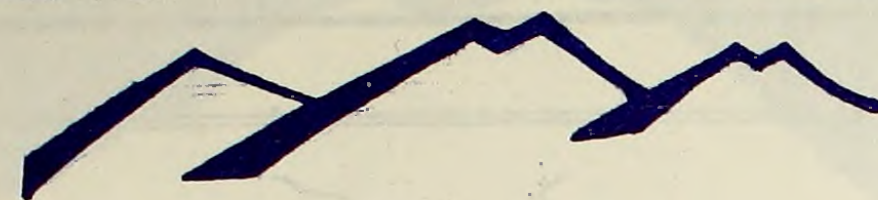
Site No.	Water	Fish Present	Location-Accessibility
1	Summit L.	LT,WF	Richardson Highway 6 miles N. from Paxson
2	Seven-Mile L.	LT	Mile 7: Take gravel road ¼ mile to lake. Excellent summer fishing.
3	Ten-Mile L.	LT,GR,WF,BB	Mile 10: Pull-off small. Short hike downhill to outlet. Summer fishery.
4	Teardrop L.	LT,GR,BB	Mile 10.4: Short hike down steep hill to the S. Good summer fishery.
5	Octopus L.	LT,GR,WF	Mile 11: ¼ mile S of road.
6	Little Swede L.	LT	Mile 16.8: 2½ S of highway by cat trail. Excellent fishing.
7	Big Swede L.	LT,GR,WF,BB	Mile 16.8: 2 miles S of Little Swede Lake. Excellent fishing.
8	16.8-Mile L.	LT,GR	Mile 16.8: Walk N up creek 200 yards to lake.
9	Rusty L.	LT,GR	Mile 16.8: Behind 16.8-Mile Lake. Walk ½ mile NW of 16.8-Mile Lake.
10	17-Mile L.	LT,GR	Mile 17: Small lake with fair to good summer fishing.
11	Clearwater Cr.	GR	Mile 18.1: Road crosses creek. Parking area present. Spring and summer fishery.
12	Tangle Lakes	LT,GR,WF,BB	Mile 22.5: Road crosses Tangle River. Use-sites present. Accomodations available.
13	Rock Cr.	GR	Mile 25.3: Perking area present. Fair summer fishery.
14	Landmark Gap L.	LT,GR,WF	Mile 26.3 miles due N from highway on cat trail. Good lake trout.
15	Glacier L.	LT,GR,WF	Mile 31: Perking area present on N side of highway. Follow cat trail 2 miles N to lake. Excellent summer fishing.
16	Boulder (7-Mile) L.	LT,GR,WF	Mile 31: Proceed 4 miles due N of Glacier Lake, or air charter from Summit Lake. Cabin and boats present.
17	36-Mile L.	LT,GR,WF	Mile 36: Walk ½ mile N of road.
18	46.9-Mile L.	GR	Mile 46.9: N side of road. Lake and outlet excellent for large grayling.
19	Crooked Cr.	GR	Mile 46.9-50: Creek parallels highway. Excellent fishing.
20	50-Mile L.	GR,WF	Mile 50: N side of road. Fair fishing.
21	Clearwater Cr.	GR	Mile 59: Highway crosses creek. Use-site present. Summer fishing.
22	Butte Cr.	GR,WF	Mile 79.7: Susitna River bridge crossing. Parking area S side of highway. Follow Susitna River downstream 5½ miles to creek junction.
23	Sand L.	LT	Mile 79.9: Susitna River bridge crossing, follow Sand Lake trail 2 miles S.
24	Stevenson's L.	GR	Mile 84: ½ mile S of road.
25	Butte L.	WF,LT,GR	Mile 93.8: Take Butte L. Trail, S of highway, 3 miles.
26	Brushkana Cr.	GR,DV	Mile 105.5: Use-site present. Summer fishery.
27	Canyon Cr.	GR	Mile 106.5: Perking site present. Summer fishery.
28	Seattle Cr.	GR,DV	Mile 110.9: Use-site present. Summer fishery.
29	Jerry L.	GR	Mile 125.5: 1/8 mile N of highway
30	Joe L.	GR	Mile 125.5: S side of road. Parking area present.
31	Unnamed Cr.	GR	Mile 128.2: Good summer fishery.

LT Lake Trout
WF White Fish
BB Burbot
GR Grayling
DV Dolly Varden

DENALI HIGHWAY

FISHING LOCATIONS





DENALI HIGHWAY HIKING TRAILS

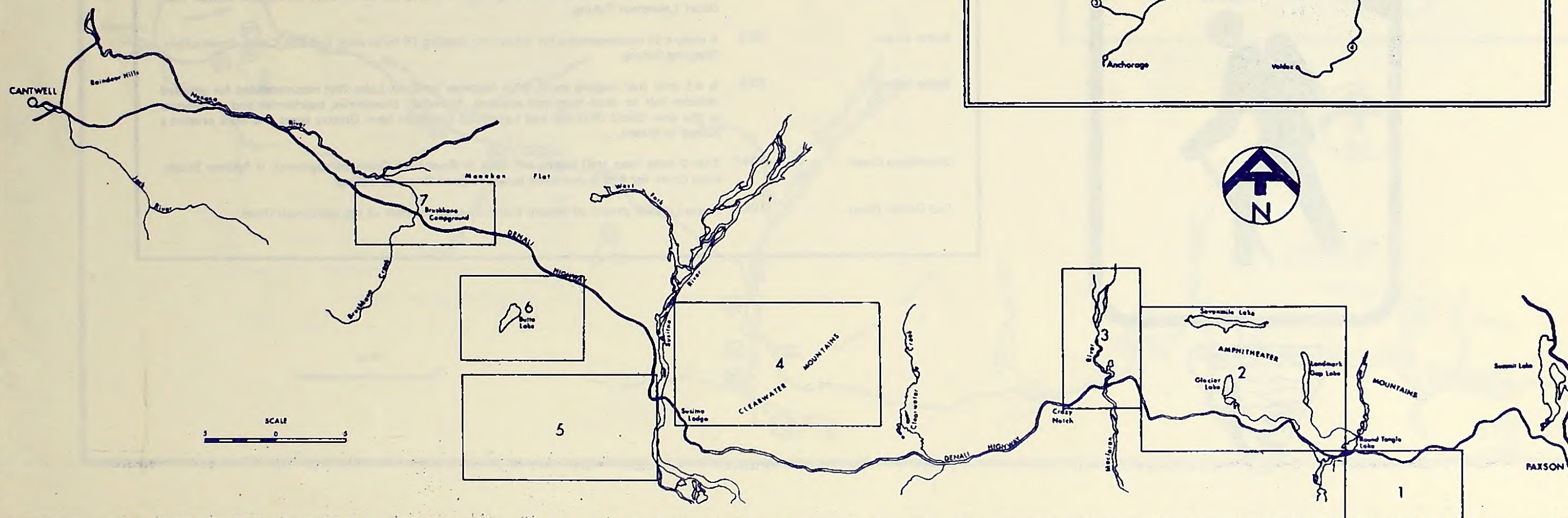
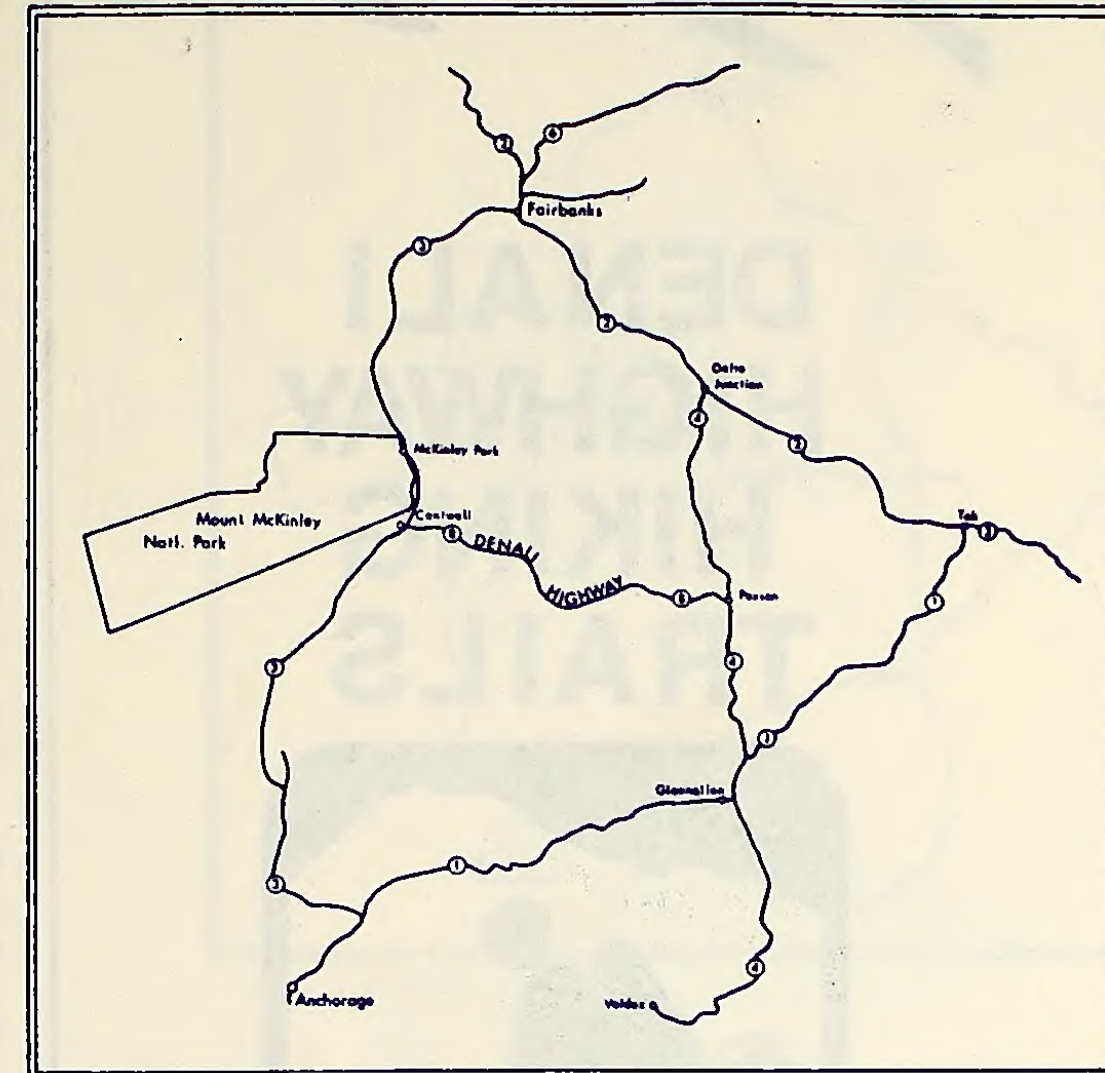


Trail Nama	Milepost	Description
Swede Lake	17	A 3 mi. long medium difficulty trail for hikers and horse packers. It is extremely difficult for 4 WD vehicles. Parking is located at the south side of the road. Trail continues 4.5 mi. beyond Sweda Lake to tha middle fork of the Gulkana River. Grizzly bears are the only hazard to hikers. Terrain is rolling. Fishing for Laketrout and Grayling.
Landmark Gap	24.6	Trail crosses rolling terrain for 2 miles north to Landmark Gap Lake. It is an easy hike for foot travelers and pack horses, but of medium difficulty for 4 WD vehicles. Parking available in Gravel Pit on north side of road. Fishing for Laketrout and Grayling.
Glacier Lake	30.5	Trail crosses a flat, marshy valley and extends north 2 miles to Glacier Lake. A small parking area exists at the trail head. It is a difficult trail crossing two streams and a deep marsh. This trail is not recommended for wheeled vehicles. Fishing for Grayling and Laketrout.
Boulder Creek	38.9	Trail extends north from the highway, uphill 3 miles to Boulder Creek. Rated difficult for hikers and extremely difficult for 4 WD vehicles except under dry conditions. Trail extends 7 miles from highway to Sevenmile Lake. Fishing for Grayling and Laketrout.
Pioneer Access	43	Easy vehicle trail for first 3.5 miles north from highway to west fork of MacLaren River. Remaining 6.5 miles leads to the old Kathleen Margaret Copper Mine and is suited to hiking only. Two rivers must be crossed to reach the mine and caution should be exercised.
Denali Loop	79.6	A 35 mile trail through mountainous terrain and river valleys. First 6 miles to old mining town of Denali is passable by 4 WD vehicles only. Remainder of trail is suited to hiking and horse packing only. Dangers include several stream crossings and isolated back country. As a safety precaution, hikers should leave word with one of the nearby lodges.
Snodgrass Lake	80	Trail extends 2 miles south of highway to Snodgrass Lake. Easy hiking and vehicle trail, Good Laketrout fishing.
Butte Creek	80.5	A steep trail recommended for hikes only, leading 14 miles west to Butte Creek. Creek offers Grayling fishing.
Butte Lake	93.8	A 4.5 mile trail leading south from highway to Butte Lake. Not recommended for wheeled vehicles due to deep bogs and marshes. Abundant blueberries, bearberries and cranberries in the area. Good Grayling and Laketrout fishing in lake. Grizzly bears and bogs present a hazard to hikers.
Brushkana Creek	104.5	This 2 mile loop trail begins and ends in Brushkana Creek campground. It follows Brushkana Creek for 1 mite providing access to good Grayling fishing.
Old Denali Road	108.5	A good 8 mile stretch of vehicle trail following the path of the old Denali Road.

DENALI HIGHWAY

TRAIL LOCATION MAP

- 1 Swade Lake Trail
- 2 { Landmark Gap Trail
Glacier Lake Trail
Boulder Creek Trail
- 3 Pioneer Access Road
- 4 Denali Loop Trail
- 5 { Snodgrass Lake Trail
Butte Creek Trail
- 6 Butte Lake Trail
- 7 { Brushkana Creek Trail
Old Danali Road



APPENDIX E
Symbol Signs











